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TEN



TIMES

Office manager escapes clutches of desk



"At last I'm free, thanks to Nokia Mobile Connectivity solutions...and it feels great," exclaims Mary Langer, office manager.

"I thought I was imprisoned at my desk forever no hope of any release - but at last I'm free. Now I can visit more suppliers, get better deals and work whenever and however I want. Am I happy or am I happy...?" Mary enthused at her first taste of freedom. Workers everywhere from CEOs to Account Managers

**Secure,
Reliable,
Freedom and
Flexibility**

are rejoicing today at the thought of a real breakthrough in their working lives. "Mobility from Nokia means I can make better use of my waiting time at the airport,"

CEO, Don Baker, "which gives me more family time when I get home." Even sales manager, John Paas, was overjoyed as he realized his field sales team could visit even more customers, now that they were able to securely access company data while on the road. "They can check emails from home, at the office," he said. "And best of

Introducing a new era of secure, corporate business freedom and flexibility — Nokia Mobile Connectivity solutions.

Employees throughout an enterprise want to be more mobile and productive — and this can be realized thanks to Nokia Mobile Connectivity solutions. CEOs and IT managers can provide the mobility and security of anytime, anywhere access to users — while empowering everyone from the CEO to field salesforce teams with the information needed to do their work where and when they choose. Nokia Mobile Connectivity solutions include a range of IPSec- and SSL-based client and gateway products that



provide secure, appropriate access to corporate email and applications. Enterprises will discover new levels of efficiency from their workforce, while giving them greater freedom to manage their business and personal lives. All solutions are easy to deploy and manage, are based on award-winning technology and are backed by Global Support and Services. So if you want greater working freedom that's IT approved, go ahead and escape.

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KNOWLEDGE CENTER STORAGE

The New Rules of Storage

Laws such as HIPAA and the Sarbanes-Oxley Act are forcing IT managers to re-examine their storage infrastructures to make sure the business complies. This special report examines the ramifications of regulations that require com-

panies to store more data, and for longer periods of time. **PACKAGE BEGINS ON PAGE 25.**

26 The Story So Far: David A. Patterson, who led the team at the University of California, Berkeley, that developed the idea of RAID storage, describes the thinking behind the technology.

32 Regulated Storage: A closer look at two storage-intensive regulations, HIPAA and the Sarbanes-Oxley Act, and how some organizations are adding storage capacity and developing new policies to ensure that they're in compliance.

36 The Data Life Cycle: IT storage managers are using information life-cycle management, a nascent concept for managing data from cradle to grave, to make sure records-retention policies are enforced.



42 Keeping a Safe Distance: Although IP storage can be a data and cost saver, only a handful of banks and brokerages have been reaping the benefits of long-distance IP replication for data recovery.

44 Opinion: Disk capacity is doubling every year; prices are dropping. What's not to like? Plenty, says columnist Mark Hall.

46 Users Build ICSI Momentum: IT managers at three early adopters of ICSI SANs, including Adrian Porter (right) at I-800 Contacts, talk about their experiences with the new technology and identify some problems they've encountered.



52 The Almanac: The world's smallest 4GB hard drive and the headaches of storing 5 petabytes of biometric data are among the topics covered in this eclectic collection of storage news.

54 QuickStudy: A primer on two storage interfaces, serial and parallel. While parallel transmission has historically been the preferred way to write data to disk, at current speeds, serial transmission can be faster and offers other advantages.



56 Careers: Storage requirements brought on by new legislation are forcing some IT managers, like Cary Group's John Halanska (left), to resign and retrain employees to handle risk management, adhere to business rules and ensure privacy.

58 The Next Chapter: Our group of industry prognosticators foresees cell phones packing a terabyte of storage and extremely remote data archiving at a server farm on the moon.



Seven Tips for Negotiating A Storage Deal

Complex storage projects are often hindered by issues that can be avoided with proper planning early in the game. Robert Galante and Michele Hinder, IT staff directors at the Federal Reserve Bank of New York, offer these negotiating tips to

minimize the risks to your company. @ QuickLink #2884

Sale and Legal Data Destruction

The era of records retention and destruction has become something of a minefield. IT staff must use all of their resources to navigate through the mine safely

and lawfully, write Alan E. Brill of Krill Technology Services and Kristin M. Nimmer of Krill Outback. @ QuickLink #2885

What Storage Dealers: Dealers share their own stories about storage products gone wrong. @ QuickLink #2701

AT DEADLINE

Microsoft Targets Spam in Exchange

During his Comdex 2003 keynote presentation, Bill Gates, Microsoft Corp.'s chairman and chief software architect, was expected to detail plans to add a heuristic-based anti-spam tool to Exchange. The tool will analyze patterns of content in messages to screen out spam, according to information obtained by the IDG News Service. Microsoft confirmed that it would make a spam-related announcement at Comdex.

Dell Reports Big Rise in Results

Dell Inc. reported a 10% year-over-year increase in revenue and a 2% jump in net income for its third quarter, which ended Oct. 31. Dell did \$10.8 billion worth of business in the quarter and earned a profit of \$677 million. During a conference call, CEO Michael Dell said that the IT market has stabilized and that the company still has "lots of room to grow" in areas such as servers and storage.

Former Gateway Exces Fare Charges

The Securities and Exchange Commission charged Gateway Inc.'s former CEO and two other one-time top executives with fraud for allegedly cooking the company's books in 2000 to meet Wall Street expectations. But the SEC said it signed a settlement deal with Pewee, Calif.-based Gateway Inc. The company agreed to an order prohibiting it from any future violations of U.S. securities laws.

Short Takes

Sources said SUN MICROSYSTEMS INC. will announce plans at Comdex to build servers based on ADVANCED MICRO DEVICES Inc.'s Opteron processor. Sun declined to comment. . . . IBM said it has acquired Productivity Solutions Inc., a Jacksonville, Fla.-based vendor of retail self-checkout systems.

SQL Server Users Focus On Database's Security

Microsoft plans to tighten controls with Yukon release

BY MARC L. BONHINI
SEATTLE

IN THE AFTERMATH of the Slammer worm that wreaked havoc with many SQL Server users early this year, Microsoft Corp. is trying to make its database software more secure. But there's still room for improvement, several database administrators said last week.

In response, Microsoft officials said at a conference held by user group the Professional Association for SQL Server that they're taking steps to tighten security in the next version of the database, which is code-named Yukon and due for release in the second half of next year. For example, Web services capabilities and other functionality deemed to be controversial will be turned off by default when the software is shipped.

"Security is the most important thing in our business," said Gordon Mangione, vice president in charge of SQL Server. Microsoft had already started to focus more resources on SQL Server security before Slammer's outbreak, Mangione said, adding that users should install the company's existing Baseline Security Analyzer tool to help detect system vulnerabilities.

Townsend Analytics Ltd., a Chicago-based financial software vendor that runs SQL Server 2000, is beta-testing the 64-bit Yukon release. "Pre-Yukon, there were things we saw that could certainly be improved," said Rebecca Lewis, director of systems at Townsend. Lewis added that Slammer "had a large impact on us," requiring Townsend's IT staff to spend a weekend working to repair its systems. The default shut-off of some

features in Yukon is a good step, Lewis noted. However, she said it would have been helpful if Microsoft had offered some way to automate the process of turning off services in SQL Server 2000, which her staff has had to do manually.

Don Waters, data group manager at film processor PhotoWorks Inc. in Seattle, said Microsoft may have to offer more resources to train database managers on how to take advantage of the security features built into SQL Server. "It's hard to be a security expert, developer and database administrator," Waters said.

Microsoft also has "a long way to go" to make it easier to add so-called hot fixes to systems running SQL Server without taking them offline.

said Jose Amado-Blanco, a database administrator at Verizon Communications' customer support operations in Temple Terrace, Fla.

Microsoft officials said SQL Server 2000 can't support the kind of automation sought by Lewis. They added that the Yukon software will include support for applying hot fixes without rebooting systems.

The security issues facing Microsoft and its database users aren't just technical ones, said Charlie Garry, an analyst at Meta Group Inc. Many of the security problems involving SQL Server are caused by poor database management policies or processes on the part of IT managers, Garry said. But, he added, the Best Practices Analyzer con-

How Microsoft Is Improving SQL Server Security

All nonessential database services will be turned off by default in the upcoming Yukon release, resulting in reduced DBAs to activate them.

With some cases, Yukon users also will be able to install software patches without rebooting their database servers.

The company announced a new tool that IT managers can use to analyze SQL Server 2000 installations for common configuration errors.

figuration tool announced last week for SQL Server 2000 should help reduce "user culpability" for database security breaches. © 42841

MORE NEWS

Microsoft is releasing SQL Server's tools for moving information between databases.

QuickTake 42839
www.computerworld.com

Microsoft Releases Four Patches Under New Monthly Schedule

BY JAMESMURRAY EVANS

UNDER its new monthly patch release schedule, Microsoft Corp. last week announced four patches for various flaws in its Windows software.

Three of this month's patches are for "critical" vulnerabilities, while the fourth fixes

an "important" flaw.

Users are still trying to adjust to the new schedule.

The monthly cycle makes patching easier and more predictable from an administrative standpoint, said Mike Tindor, vice president of network operations at First USA Inc., an Internet service provider in St. Clairsville, Ohio. "It can definitely see where this is more beneficial," particularly for large companies, he said.

But the whole scheme can fail if attackers are able to discover and exploit vulnerabilities during the interim between Microsoft's monthly patch releases, Tindor said. "It all boils down to whether I trust that a vulnerability that Microsoft knows about, but for which they do not release a patch for weeks, will remain undisclosed," he said.

But according to Microsoft, that concern is misplaced.

"If there's a major three at facing customers, Microsoft will definitely release a patch as soon as possible" rather than wait for the monthly release, a company spokesman said. He said that fact is mentioned in the announcement and in white papers detailing the monthly patch program.

The critical patches released last week included one for fixing five newly discovered vulnerabilities in Microsoft's Internet Explorer Web browser. The flaws could allow attackers to carry out a variety of malicious actions such as taking administrative control of a victim's system, reading files stored on hard disks and downloading malicious code. The cumulative patch also includes functions for fixing all previously announced flaws in Internet Explorer 5.01 and 5.5, according to Microsoft. © 42836

WHAT'S NEW

Microsoft's Latest Security Updates

CRITICAL

MS03-048: Cumulative Security Update for Internet Explorer

MS03-049: Buffer Overrun in the Workstation Service

MS-03-051: Buffer Overrun in Microsoft FrontPage Server Extensions

IMPORTANT

MS02-008: Certificate Validation Flaw

Legislation to Alter Federal IT Services Procurement

Shift to performance-based contracts would increase flexibility for vendors

BY DAN VENTON
WASHINGTON

The Senate last week passed a bill that's poised to significantly alter the way federal agencies procure IT services.

The Defense Authorization bill includes the Services Acquisition Reform Act, also known as SARA. Introduced earlier this year by Rep. Tom Davis (R-Va.), SARA would move the government away from costly "time and materials" contracts. The bill is now being prepared for President Bush to sign.

A key section of the SARA provisions offers incentives for agencies to use performance-based contracts, a shift that analysts and industry executives said will force IT product and services vendors to change the

way they do business with the federal government.

Most IT service providers will likely benefit from the legislation because it will give them flexibility to choose the best commercial technologies to use under a contract, rather than having to build custom products to meet government specifications, said Jim Howard, CEO of CrownPeak Technology, a Los Angeles-based Web content management service provider that counts many agencies among its customers.

The legislation would also benefit the government by ensuring that money isn't spent on products and services that aren't doing what it needs them to do, he said.

"With the [performance-

based] software service model, in which you pay for what you use, the vendor is taking the chance that the software will work well for the customer, as opposed to the government paying a lot of money to make it work and then betting that the entire enterprise will use it," Howard said.

Risky Business

SARA is also likely to have a significant impact on systems integrators that do custom work on an hourly basis, Howard said.

Some large systems integrators have historically shied away from performance-based contracts, which they consider a risky approach to business, said Mike Barbee, president and general manager of WamNet Government Services Inc., a Herndon, Va.-based company that's helping

to build the U.S. Navy's \$6.9 billion intranet.

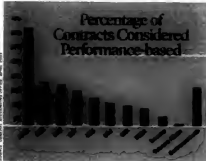
"The big systems integrators are relatively inexperienced at this and are risk-averse. So there's a question if they will embrace this," he said.

On the government side, performance-based contracting "really requires a lot of upfront planning on service-level agreements by the agencies involved," said Barbee. "And some agencies view the re-

quirement to define the end state as risky. They will ask themselves, 'What if we're wrong?'"

But all agreed that performance-based contracting will have clear benefits for the government.

"They pay for what they get," said Barbee. "With time and materials contracts, the bill comes in every month, regardless of what was accomplished." **Q 42832**



CIOs Detail IT Cost-Cutting Moves

Tech chiefs lower expenses through small steps, overhauls; some face resistance

BY LUCAS NEARMAN
COLUMBUS, OHIO

Sam Coursen, CIO at NCR Corp., last week said he has saved more than \$20 million in IT expenses over the past year or so by eliminating what many of the company's end users previously considered fixed-cost items.

For example, scrutinizing who gets company-funded mobile devices such as cell phones, handhelds and laptop computers as opposed to desktop PCs has saved NCR millions of dollars, he said.

Coursen was among more than 150 CIOs who attended a symposium here that focused on guiding IT departments through turbulent economic times. The conference was hosted by the Columbus Tech-

nology Council and the Center for Information Technologies in Management at Ohio State University.

Dayton, Ohio-based NCR was spending \$7 million per year on voice conferencing alone, an expense that Coursen said he was able to cut dramatically by looking at how the technology was being used and by whom.

But limiting the use of new technology by end users isn't the only way NCR is reducing its IT costs. Coursen said the technology vendor is rolling out a global ERP system and has migrated to a shared-ser-

vices model for IT as part of the project, producing about \$100 million in annual savings. "We don't do any projects anymore that don't have a one-year payback," he noted.

Not everyone is finding it so easy to take the kind of steps cited by Coursen. During a

"We don't do any projects anymore that don't have a one-year payback."

SAM COURSEN, CH, NCR

panel discussion, Brad Dunnington, senior vice president of strategy at Edwards Industries Inc. in Columbus, said he has had a hard time setting up shared IT services across a decen-

tralized group of operating companies whose managers tend to fight over how the services are allocated to their individual departments.

Mike Curtin, president and CEO of The Dispatch Compa-

nies Inc., which owns The Columbus Dispatch newspaper, said he counts on his IT department to determine which projects are most valuable to the company as a whole. "We rely on the IT team to be the honest broker between departments," he said.

Buy or Lease?

Ohio's state government has saved more than \$15 million in annual costs by switching from buying software to leasing the technology and then renegotiating its contracts with several key vendors, said Greg Jackson, the state's CIO.

For example, Microsoft Corp. cut \$12 million from its software contract with the state, Jackson said. He added that BMC Software Inc. reduced its contract by \$2.5 million and Cognos Inc. dropped \$3.4 million from the cost of its deal.

"We also examined utilization of data center space and found 20% of it was being

used for office space," Jackson said, noting that he asked the workers to vacate the premises and find more appropriate office locations.

Savings aside, Jackson said one of the most difficult issues he has faced is convincing his superiors that spending money on IT is hard economic times can save money in the long run. Building a reputation of successfully managing projects is the best way to win their confidence, he said.

However, Jackson said some overly hired IT executives have the advantage of lacking a track record that includes any failed systems work for their new bosses. "Your first six months as CIO, you're on your honeymoon," he said. "That's the time to obtain results." **Q 42844**

Tough Talk

The DHS's Steve Cooper says he's pushing Microsoft to improve software security

QuickTake 42800

www.computerworld.com

BRIEFS

Cisco to Acquire Conferencing Tools

Cisco Systems Inc. said it may pay about \$80 million to buy Latitude Communications Inc., a vendor of video- and audio-conferencing software and Web-based collaboration tools in Santa Clara, Calif. The deal is expected to be completed by the end of January. Latitude, which has about 180 employees, will become part of Cisco's voice technology group.

SAP Ends User Show in Europe

SAP AG said it's discontinuing the European version of its Sapphire user conference and will replace it with a series of meetings in different countries. The software vendor added that Sapphire will continue to be held in the U.S. and will be recast as an event for users from around the world. The next conference is due to take place in May in New Orleans.

IBM Upgrades Mobile Database

IBM announced an upgrade of its DB2 Everywhere mobile database that supports handheld devices and automated synchronization of data with corporate systems. IBM also said it's bundling its J9 Java virtual machine code with the Version 8 release and adding integration to Microsoft Corp.'s .Net development technology. Pricing for the enterprise edition starts at \$15,000 per CPU.

Short Takes

NOVELL INC. released an upgrade of its Red Carpet systems management tools for Linux servers and desktop PCs. . . The U.S. PATENT AND TRADEMARK OFFICE said it's re-examining a Web browser plug-in patent that a federal court jury in August ruled MICROSOFT had infringed upon. The ruling triggered a plan by Microsoft to modify Internet Explorer (QuickLink 41926).

MARK HALL • ON THE MARK

Economic Woes Gave Java a Breather as ...

... companies kept .Net at arm's length, hesitating to invest in Microsoft Corp.'s new development framework. **Java proponents were able to hold their ground during the long downturn because it would have been too expensive for users to shift to a new development environment, whatever its advantages might be.** Tim Kinslow, practice manager for Web-based solutions at Trigent Software Inc. in Natick, Mass., says even most IT shops with Microsoft technology investments "pushed and tweaked" Active Server Pages as far as they could instead of jump-

ing on the .Net bandwagon. That's changing quickly: "We've had more interest among our clients in .Net in the past four months than in the past two years," Kinslow claims. "Now people are talking about legacy migrations to .Net." By no means does Kinslow argue that Java will disappear. The point, he says, is that the two environments will increasingly have to work together. The issue for IT managers is to determine where their organizations' strengths lie. That means people. "Where are the hearts and minds of your developers?" Kinslow asks. Do you have cubicles crowded with Java junkies or Visual Basic users? Either way, you'll need to insist that they write applications with Web services' connections to the outside world. "The programmers will still hate that other," he says, "but at least the code will be compatible." When pushed for a conclusion about which approach has the long-term advantage, Kinslow reluctantly gives

the nod to .Net. "It comes down to languages," he says. "I'm a programmer at heart, and .Net supports a variety of languages. Java is just Java." Web services will be the primary reason to jump to ATO 6.2, being released in mid-December by Art Technology Group Inc. in Cambridge, Mass. According to CTO Fumi Matsumoto, users of previous releases of the CRM and portal software needed to write custom code to link to other applications.

With the impending release, developers need only write standard SOAP wrappers loaded with XML data to communicate with other environments. • Stu Siquerman, founder and chief operating officer of Clearwater, Fla.-based Sunbelt Software Inc., boasts that revenue from his aply and succinctly named anti-spam product, **HotSpam**, jumped from \$600,000 in 2002 to better than \$2 million so far this year. But he thinks sysadmins need an even more com-

prehensive mail tool to alleviate their e-mail miseries. That's why his developers are working on a messaging management system code-named Messaging Ninja. It will not only fight spam, but also handle content filtering and include appropriate disclaimers to messages for legal reasons. Expect a first-quarter 2004 delivery. • Although PowerPoint presentations may not be spam, they do seem as ubiquitous. And you can expect to see even more of them when Plus Vision Corporation of America releases its V3-D projector next month. At 2.2 lbs. and smaller than most books on your shelf, the projector will be a hit with mobile sales forces and may become a new headache for you to manage. Mark Hand, marketing vice president at the Beaver-ton, Ore.-based company, says he increasingly needs IT shops to sign off on these devices because IT ultimately will support those devices. • If you're not capable of connecting to 802.11 wireless networks and displaying output from any PC on the network, adding to IT's interest in the projector. But at least they typically hit the sales and marketing budget rather than yours. The XGA version costs \$2,000 and the SVGA \$1,500, somewhat more than those laptops that did hit your budget. • Business process management software can get lost on the road if you've got a laptop and a connection. But if you've got access only to a cell phone or PDA, you've been out of the loop. No more. Starting the first week of December, CommerceQuest Inc. in Tampa, Fla., ships Traxion Mobile, a module for its Traxion Business Process Management system. Traxion Mobile lets users of Java-enabled cell phones, palm handhelds and other mobile devices complete tasks and get new assignments and updates while in transit, at construction sites, walking down Fifth Avenue and virtually anywhere else. With prices starting at \$50, you can easily afford to stay in the loop. • **CDT01**

Get Minds Fused

Drug companies, planning that high development costs are the reason why the same drug costs more here than in Canada, may have a weaker argument when they go to Congress. In Scotland, AVE, releases its Clinical Trials Lifecycle Management software this week. The product automates the costly exchange of paperwork among research, clinical trial and approval bodies.

Macromedia Woos Corporate Developers

BY CAROL BLIVA
Macromedia Inc.'s Flash technology has been popular with developers who create animated Web pages, but the San Francisco-based company will try to extend its reach by giving corporate programmers a new way to build rich clients for transactional Internet-based applications.

Today, Macromedia plans to release a beta version of Flex, a server software product and

application framework that can be used with the tools and infrastructure corporate developers are already using.

Joshua Dahl, an analyst at IDC in Framingham, Mass., said corporate developers have been reluctant to use Flash because of its different programming paradigms.

But Macromedia has created a new XML-based language, called Flex Markup Language, that a developer

can use to describe the user interface of an application.

The Flex application framework provides prebuilt code and runtime services for data connectivity, and the Flex server compiles the code into a file that is sent to the browser, where it's rendered by Macromedia's Flash Player.

Rod Hodgman, vice president of product management at Macromedia, said the initial Flex release will run on top of

J2EE-based application servers, including his company's JRun, IBM's WebSphere, BEA Systems Inc.'s WebLogic and the Apache Software Foundation's open-source Tomcat. Flex is due in the first half of next year. A beta version will follow, Hodgman added.

Macromedia also plans a tool, based on its Dreamweaver MX 2004, to provide visual layout and integrated design, development and debugging for Flex applications. A beta is due next month. • **CD243**

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the nod to .Net. "It comes down to languages," he says. "I'm a programmer at heart, and .Net supports a variety of languages. Java is just Java." Web services will be the primary reason for Java's resurgence, being released in mid-December by Art Technology Group Inc. in Cambridge, Mass. According to CTO Fumi Matsumoto, users of previous releases of the CRM and portal software needed to write custom code to link to other applications.

With the impending release, developers need only write standard SOAP wrappers loaded with XML data to communicate with other environments. • Stu Sprowman, founder and chief operating officer of Clearwater, Fla.-based Sunbelt Software Inc., boasts that revenue from his aply and succinctly named anti-spam product, MailSpam, jumped from \$600,000 in 2002 to better than \$2 million so far this year. But he thinks syndicates need an even more com-

prehensive mail tool to alleviate their e-mail miseries. That's why his developers are working on a messaging management system code-named Messaging Ninja. It will not only fight spam, but also handle content filtering and include appropriate disclaimer to messages for legal reasons. • A first-quarter 2004 delivery. • Although PowerPoint presentations may not be spam, they do seem as ubiquitous. And you can expect to see even more of them when Plus Vision Corporation of America releases its V3-13 projector next month. At 2.2 lbs. and smaller than most books on your shelf, the projector will be a hit with mobile sales forces and may become a new headache for you to manage. Mark Hand, marketing vice president at the Beaverton, Ore.-based company, says he increasingly orders IT shops to sign off on these devices because IT ultimately will support those most books on your shelf, capable of connecting to 802.11 wireless network and displaying output from any PC on the network, adding to IT's interest in the projector. But at least they typically hit the sales and marketing budget rather than yours. The XGA version costs \$2,000 and the SVGA \$1,500, somewhat more than those laptops that did hit your budget. • Business process management software can work great on the road if you've got a laptop and a connection. But if you've got access only to a cell phone or PDA, you've been out of the loop. No more. Starting the first week of December, CommerceQuest Inc. in Tampa, Fla., ships Traxion Mobile, a module for its Traxion Business Process Management system. Traxion Mobile lets users of Java-enabled cell phones, Palm handhelds and other mobile devices complete tasks and get new assignments and updates while in taxis, at construction sites, walking down Fifth Avenue and virtually anywhere else. With prices starting at \$50, you can easily afford to stay in the loop. • 42891

Macromedia Woos Corporate Developers

BY CAROL BLUMA

Macromedia Inc.'s Flash technology has been popular with developers who create animated Web pages, but the San Francisco-based company will try to extend its reach by giving corporate programmers a new way to build rich clients for transactional Internet-based applications.

Today, Macromedia plans to release a beta version of Flex, a server software product and

application framework that can be used with the tools and infrastructure corporate developers are already using.

Joshua Dahl, an analyst at IDC in Framingham, Mass., said corporate developers have been reluctant to use Flash because of its different programming paradigm.

But Macromedia has created a new XML-based language, called Flex Markup Language, that a developer

can use to describe the user interface of an application. The Flex application framework provides prebuilt code and runtime services for data connectivity, and the Flex server compiles the code into a file that is sent to the browser, where it is rendered by Macromedia's Flash Player.

Red Hodgman, vice president of product management at Macromedia, said the initial Flex release will run on top of

J2EE-based application servers, including his company's JRun, IBM's WebSphere, BEA Systems Inc.'s WebLogic and the Apache Software Foundation's open-source Tomcat. Flex is due in the first half of next year. A net version will follow, Hodgman added.

Macromedia also plans a tool, based on its Dreamweaver MX 2004, to provide visual layout and integrated development and debugging for Flex applications. A beta is due next month. • 42843



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Users of Online Job Services Risk Lack of Privacy Protection

Yearlong study reveals sales of personal information, profiling of job seekers

BY JANKAMUR VILKARIAN

JOB SEEKERS who go to online sites to look for employment run a considerable risk of having their personal information improperly sold, shared or used for profiling purposes.

That's the finding of a year-long study on the privacy practices of job-related Web sites, that was released last week by The World Privacy Forum, a privacy rights organization in San Diego.

The study of more than 70 online job sites, employment kiosks, resume databases and resume distribution services has revealed problems such as the sharing and sale of job-seeker data and undisclosed tracking and profiling of users, according to primary researcher Pam Dixon.

"We really need a whole new way of talking with job seekers about how they can look for jobs and not get [their personal information] tracked, sliced and sold in multiple ways," Dixon said.

Too Much Information

A tendency to collect too much information, a lack of consistency in handling ethnic and racial data, overuse of cookies, and frequent sharing of data with third parties and advertisers were other problems identified in the survey.

Companies that allow potential hires to file job applications online aren't faultless either, Dixon said. Often they fail to mention that their sites are outsourced to third parties that may have privacy policies that are different from their own.

The rapid proliferation of employment application job kiosks inside shopping malls and retail stores also presents a problem because few of

them post any privacy policies when collecting confidential information, Dixon said.

One example highlighted in the study was Workland, One-based Unifera Inc., which is the largest operator of these kiosks. Unifera's clients include Woonsocket, R.I.-based pharmacy chain CVS Corp.

A Unifera spokeswoman said the company's practices meet legal guidelines.

In some cases, information

that was collected for one purpose was being used for other purposes, the study said.

Passing It On

FastWeb.com, a scholarship search service owned by Maynard, Mass.-based Monster Inc., collected information on ethnicity, nationality and religion from students for scholarship purposes but then shared the information with employers looking to diversify their workforces.

A spokesman for FastWeb said that in all instances in which such information was

passed on to an employer, it was done only with the full consent of the students.

Another example cited in the report was Cambridge, Mass.-based Elyon Technologies Inc., which maintains profiles of over 10 million individuals from over 1 million companies. The profiles are used by 25 of the Fortune 100 firms in their recruitment processes.

But Elyon doesn't have a formal privacy policy, offer an opt-out policy or give individuals a chance to correct the information in its database, Dixon said.

Snow Job?

■ Lack of consistent policies relating to the collection and use of ethnic and racial information about job seekers.

■ More persistent use of cookies by job seekers.

■ Increased reliance on third-party legal ways to sharing job-seeker data with other parties.

Jonathan Stern, CEO of Elyon, dismissed the concerns and said the information in the company's databases is compiled from publicly available records. **C 42837**

Cisco Targets SSL VPN Vendors, Adds Support for Clientless Security Protocol

Installed base of VPN devices may give it an edge, despite late entry

BY MATT HARMLEN

Cisco Systems Inc. last week said it will add support for the Secure Sockets Layer protocol to its virtual private network hardware, elbowing its way into a market now occupied by many smaller vendors—some of which began shipping SSL VPN technology two years ago.

But Cisco's entry, though late, should be welcomed by the networking vendors installed base, according to several analysts. Their predictions were seconded by Stephen Smith, network manager at Keystone Mercy Health Plan in Philadelphia.

"I've been waiting for this with great anticipation," Smith said. Mercy Health, a Medicare-managed care company, currently uses a Cisco VPN 3030 device that supports the

IPsec security protocol to provide secure transport capabilities to about 200 end users who work from home.

But Smith noted that the SSL VPN technology is clientless and should be able to work with some Web applications that don't function well with IPsec. "We've had problems with IPsec, and we've needed clientless [capabilities]," he said.

Cisco's new offering, called WebVPN, will also let Mercy Health use its existing VPN

3030 appliance to provide both IPsec and SSL VPN functionality. "I don't want [to add] another platform, and with this approach,

Cisco officials said WebVPN will be built into new concentrators starting in January and will be made available at no extra cost to current users (see box).

There are "millions" of Cisco's VPN 3030 series concentrators in use, which will give the company a big advantage over other SSL VPN vendors,

said Joel Conover, an analyst at Current Analysis Inc. in Sterling, Va. "Cisco's entry will have a profound impact on the SSL VPN market," he predicted. "It changes the competitive nature of the market."

Limitations

Conover said the first release of WebVPN has weaknesses, including an inability to support Web portals based on Citrix Systems Inc.'s software. Some of the shortcomings are

due to the fact that the VPN 3000 line is three years old.

For example, the devices can't handle more than 200 concurrent users, Conover said, which could be a drawback for IT managers who need to support thousands of users and don't want to stack numerous concentrators.

But Conover added that he expects Cisco to make the necessary improvements quickly and eventually dominate SSL VPNs as it does so many other parts of the networking market.

Having IPsec and SSL VPN functionality in a single box will help Cisco because many companies need to use both technologies, said Zsuzsanna Kervavala, an analyst at The Yankee Group in Boston.

For many smaller vendors of SSL VPNs, Cisco's entry into the market with a free offering "means their future is pretty limited," he said.

Kervavala added that in an October survey of 248 large and midsize companies, about 95% said they would consider buying SSL VPN technology from Cisco. That was far more than any of Cisco's rivals scored on the survey, which was funded by a group of vendors that Kervavala wouldn't identify. **C 42896**

MORE INFO

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Cisco's WebVPN Technology

- Based on the company's VPN 3000 Series hardware devices, which already support the IPsec security protocol.
- Is becoming available to January as part of Version 4.1 of the software that comes with the appliances.
- Is being offered at no added cost to existing VPN 3030 users who have product support contracts with Cisco.

Users of Online Job Services Risk Lack of Privacy Protection

Yearlong study reveals sales of personal information, profiling of job seekers

BY JAIKUMAR VIJAYAN

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MORE INFO

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BRIEFS

Storage Standard Gets Fast Review

The Storage Networking Industry Association (SNIA) said its proposed storage management interface standard is being put on a fast-track review by the International Committee for IT Standards in Washington. The San Francisco-based SNIA said it hopes that the process will result in the Storage Management Initiative Specification being approved as an official ANSI standard by mid-2004.

Onyx Seeks to Buy CRM Rival Pivotal

Bellevue, Wash.-based Onyx Software Corp. announced an unsolicited bid to acquire CRM rival Pivotal Corp. from the arena of a third vendor. Pivotal last month agreed to a \$47 million cash buy-out by an investment firm that wants to combine it with Tullman Corp. But Onyx said that with Tullman offer is worth \$50 million at current prices. Vancouver, British Columbia-based Pivotal said it will review the proposal.

Mobile Phones Hurt PDA Market

Worldwide shipments of handheld devices continued to decline in the third quarter, partly as a result of competition from mobile phones with similar functions, according to Gartner Inc. Gartner said global handheld shipments slipped 0.2% to 2.52 million units, resulting in the eighth consecutive quarter of year-over-year declines.

Short Takes

ADORE SYSTEMS INC. said it has acquired the technology assets of Yellow River Software Corp. in Vancouver, British Columbia, to bolster XML support in its document management products. ... VITRA TECHNOLOGY INC. in Sunnyvale, Calif., this week will announce an upgrade of its BusinessWare application integration software.

Private Sector Key To Cybercrime Fight

Secret Service raises level of awareness

BY DAN VERTON
STANFORD, CALIF.

FEDERAL LAW enforcement officials' battle against organized cybercrime is beginning to make some progress. But more cooperation is needed from the private-sector companies that are the targets of these criminal groups.

That's the conclusion of officials who took part in this month's IT Preparedness Exercise here, sponsored by the U.S. Secret Service. Computerworld was granted exclusive access to the exercise under an agreement that the content and results of the scenarios used not be disclosed.

Top Execs Involved

The exercise, held Nov. 5-6 on the campus of Stanford University, included more than 180 senior-level executives from the private sector. It was the third in a series of Secret

It's not a reactive model. It's 'Get your butt out from behind the desk and go help.'

ROBERT WEAVER, DEPUTY SPECIAL AGENT, NEW YORK ELECTRONIC CRIMES TASK FORCE

Service IT Preparedness Exercises mandated by the Department of Homeland Security. The Secret Service is now a DHS agency.

Although detailed results of the exercise can't be disclosed, the bulk of the corporate representatives present indicated that they lacked knowledge about the various private-sector Information Sharing and Analysis Centers. Many were either unfamiliar with the role of ISACs or unaware of their existence altogether.

Enough questions were

raised on the first day that the exercise planners made an impromptu presentation by a senior representative of the Financial Services Sector ISAC on what ISACs are and what they do.

This lack of awareness, which has been evident at other conferences attended by other industry groups [Quick Link 4215], is one of the primary reasons the Secret Service holds the exercises, officials at the event said.

Communication Essential

"The primary mechanism that needs to be in place is a strong and robust relationship and communication between the private sector and the government, such as that provided by the ISACs," said John Frazzini, vice president for intelligence operations at Reston, Va.-based security firm iDefense Inc., and a former agent and founding member of the electronic crimes division at the Secret Service. "Without that,"

Frazzini explained, "it will be a hedgehog approach that will not be very effective. This is an opportunity for corporate executives to get involved and contribute."

Frazzini also contributed to an October World Bank report, "Electronic Safety and Soundness: Securing Finance in a New Age," which concludes that the lack of accurate and timely reporting of cybercrime incidents is hampering the overall battle against cybercrime.

"The private sector will need to make unprecedented efforts to cooperate with law enforcement agencies and with supervisory authorities within and across borders due to the very global nature of the Internet technology backbone," the World Bank report states.

Robert Weaver, deputy special agent in charge of the Secret Service's New York Electronic Crimes Task Force, said companies in critical-infrastructure sectors don't have to experience a loss or want to prosecute to ask the Secret Service for assistance. "It's not a reactive model," he said. "It's 'Get your butt out from behind the desk and go help.'"

C 42833

CSOs Join Forces Against Cyberthreats

Former White House adviser to lead group

BY JAMIKAR VIVIAN

Information security executives from such high-profile companies as eBay Inc., Bank of America Corp., Microsoft Corp. and Oracle Corp. last week announced the creation of a Global Council of Chief Security Officers to collaborate in defending against cyberthreats.

The effort, spearheaded by Howard Schmidt, former White House cybersecurity adviser and currently CSO at eBay, will focus on enabling better communications on security issues between the pri-

vate and public sectors.

Details about how the group will do that will become available after its first formal meeting in January.

"We plan to use the collective expertise of all the members of the council to really continue the momentum we have seen over the last couple of years" around cybersecurity, Schmidt said at a press conference last week. "We are bringing together selective expertise from the private sector, academia and the government to continue the dialogue and to make sure that [cybersecurity] remains a Tier 1 issue."

One goal of the effort is to build a greater leadership role for the private-sector companies that own and operate

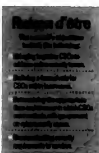
much of the critical infrastructure, said Mary Ann Davidson, CSO at Oracle.

"Since government doesn't own cyberspace, it is important that the security kahuna of private industry work together to help implement and support it," she said. "It can't just be the government saying, 'This is what you shall do.' Industry has the responsibility to step up to the plate."

Lofty Stature

The stature of the individuals within the council will ensure that industry concerns are well represented to the government, said John Pescatore, an analyst at Gartner Inc.

"Getting working CSOs from big companies together



is really important because there is a lot of knee-kick 'we need legislation' type talk floating around" government circles, Pescatore said. "There are very senior people who have a lot of others listening to them." C 42819

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Oracle Seeks Speedier Ruling In PeopleSoft Poison Suit

Asks court to block refund offer

BY MARC L. SOMMER

ORACLE CORP. last week took action in an attempt to keep itself from gugging on one of the poison pills that business applications rival PeopleSoft Inc. is trying to use to block Oracle's \$7.3 billion hostile takeover bid.

Oracle asked a judge at the Delaware Chancery Court for an expedited ruling on its suit to block PeopleSoft's anti-takeover provisions. In particular, Oracle pointed to a program under which PeopleSoft has promised new or upgrading users payments of up to five times the cost of their licenses if the company is bought out within two years and support for its software is ended within four years.

Pleasanton, Calif.-based PeopleSoft has said that the so-called customer assurance program has already created a potential financial liability of about \$800 million for an acquiring company. In last week's court filing, Oracle argued that the refund offer could make the cost of buying PeopleSoft "prohibitive" for it and any other would-be suitors.

"It helps the customer but makes any potential acquirer have a huge liability," Chuck Phillips, an executive vice president at Oracle, said in an interview. "It's making [PeopleSoft] worthless and taking control from the shareholders."

Phillips, Oracle's point man on the takeover attempt, added that a decision this month by PeopleSoft officials to expand the scope and time frames of the customer assurance program was "a very dangerous" move legally.

"They're out of step with the current environment of corporate governance," he contended.

"Contrary to Oracle's assertion, PeopleSoft's management is acting in the best interest of the shareholders," a PeopleSoft spokesman countered. He added that the refund offer is "very positive for customers and very positive for shareholders."

PeopleSoft user John Schindler, CIO at fighting fixtures maker L.D. Kichler Co. in Cleveland, voiced continued disapproval of Oracle's unsolicited buyout bid. "Let's put a stake in it and call this whole thing done," said



Oracle is out of step with the current environment of corporate governance.

CHUCK PHILLIPS, executive vice president, Oracle Corp.

provision like the one being employed by PeopleSoft.

"I think the tactic that PeopleSoft is taking is a desperate attempt by the CEO and the executive staff to prevent a stockholders vote on the mat-

Schindler, who managed an installation of Oracle's applications at a previous employer and is a former member of the Oracle Applications Users Group's board.

But Kyle Lambert, vice president of information solutions at John I. Haas Inc., a Washington-based hedge grower that uses Oracle's software, said he had never heard of a poison-pill

ter," Lambert said.

Like Schindler, though, Lambert wants the companies to quickly resolve the takeover fight. "If the deal makes sense, great," he said. "If the deal does not, move on."

In addition to the ongoing court proceedings in Delaware, the two vendors are waiting for the U.S. Department of Justice to announce whether it will oppose the deal on antitrust grounds.

Oracle officials had hoped to get an answer from the DOJ this month. But according to Phillips, DOJ officials now say that a decision might not be announced until next month or January.

Oracle requested the expedited ruling on its poison-pill suit just days after attorneys pursuing a shareholder class-action lawsuit against PeopleSoft filed a separate motion to block the company from promising refunds to its users.

© 42845

ORACLE STATES ITS CASE

To read all of our interview with Oracle's Chuck Phillips, visit our Web site: www.computerworld.com



Continued from page 1

AT&T Wireless

Customer service workers at AT&T Wireless ran into significant delays in setting up or modifying GSM/GPRS calling services, Siegel said, adding that the company was still trying to deal with a backlog of new users last week.

"We continue to work through issues associated with the software," he said. "We've made tremendous progress in clearing the muster up. There's a good chance folks working in to activate their GSM service will be able to do it in pretty much normal intervals."

However, some customers got fed up with waiting and took their business elsewhere. Ian Drake, an independent IT consultant in Hartford, Conn., said he switched to Verizon Wireless who he was unable to resolve start-up difficulties

on an AT&T Wireless service he ordered online Oct. 22.

"I had lost so much time with the runaround that it was affecting my consulting practice," Drake said, adding that he got "bounced around to no end" when he called customer service at AT&T Wireless.

Even canceling his contract proved to be difficult, Drake said he was informed that the cancellation couldn't be processed because the CRM system was down. After multiple calls, a customer service

worker told Drake he would be contacted when the order was reworked. "I'm not holding my breath," he said.

No Answers Forthcoming

AT&T Wireless wouldn't say how many customers were affected by the system woes, nor would the Redmond, Wash.-based company specify what caused the problems. "We're not engaging in any post-mortems," Siegel said.

AT&T Wireless in 2001 announced plans to standardize its customer-facing operations on Siebel's CRM applications. Siegel wouldn't comment about Siebel's current involvement with the company, but he said the upgrade problems weren't associated with shortcomings in the software.

"This is our responsibility," Siegel said. "It doesn't matter who developed the software." The CRM system has helped improve productivity

by giving AT&T Wireless workers access to "much more relevant information about our customers," he noted. "But sometimes, what happens in a big cutover is it doesn't perform in the way that you hoped it would."

Drake said he was told by an AT&T Wireless employee "that this problem was a Siebel upgrade gone wrong."

A systems administrator at a financial services firm in the Western U.S. said he was given a similar message last Tuesday after he tried for a second time to buy a GSM phone from AT&T Wireless. The administrator, who asked not to be identified, said he bought the first phone at a retail store on Nov. 1, the same day the CRM upgrade took place. After being unable to activate the phone for eight days, he decided to return it.

A Siebel executive declined to comment on the situation

and referred questions to AT&T Wireless.

GSM (Global System for Mobile Communications) and GPRS (Global Packet Radio Service) are cellular telephone standards. The bulky CRM system is used to automate various GSM/GPRS account management functions, such as tracking and processing new service orders.

AT&T Wireless said customers who use its Code Division Multiple Access network are handled by a different CRM system and weren't affected by the upgrade problems. © 42851

Stacy Cowley of the IDC News Service contributed to this story.

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Sometimes, what happens in a big cutover is it doesn't perform in the way that you hoped it would.

MARK SIEGEL, SPOKESMAN, AT&T WIRELESS SERVICES

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HP Combines Tools to Unify Management of Its Server Lines

Announces products, deals in bid to expand autonomic computing strategy

BY MATT HAMBLEN

HEWLETT-PACKARD Co. last week announced more than 40 IT management products and services in an effort to further its autonomic computing initiative, including new software that provides systems management capabilities across its Windows, Linux and Unix server lines.

The cross-platform product, called Systems Insight Manager, brings together three tools that HP previously sold separately and unifies management of the company's ProLiant, Integrity and HP 9000 servers. The product can also handle plug-in tools for managing PCs, storage devices, printers and power supplies as well as some third-party software, HP said. In addition, HP said that Systems Insight Manager can be integrated with OpenView

Operations and OpenView Network Node Manager, the company's flagship enterprise management tools.

Subhash Tantry, executive vice president of engineering and operations at autonomic CenterBeam, said the San Jose-based IT outsourcing vendor wants to use Systems Insight Manager in its data center, which houses hundreds of servers for the company's North American customers. CenterBeam runs HP's Insight Manager 7 tool now but needs the new software's cross-platform capabilities.

"We service the midsize market, and the diversity of hardware and software is huge," Tantry said. "We prefer

to have one [management tool] that is extensive and monitors multiple nodes." Systems Insight Manager also has a "more intuitive and process-oriented interface," he added.

Because of the nature of its business, CenterBeam has tried to keep abreast of all the management products from HP and its competitors, such as Computer Associates International Inc. and IBM's Tivoli software unit,

said Brian Johnson, director of public relations at CenterBeam. "HP is on the right track" by attempting to bring all its management tools under its autonomic computing strategy, Johnson said.

In addition to introducing Systems Insight Manager and other products (see box), HP said it plans to buy Perist

Technologies Inc., a Pleasanton, Calif.-based vendor of software for archiving e-mail messages, Microsoft Office data and other types of information. HP didn't disclose the cost of the acquisition, which is part of its plan to develop a set of information life-cycle management tools.

HP also announced an agreement with business applications vendor SAP AG, under which they will work together to facilitate management of IT infrastructures at large companies that want to adopt autonomic computing—or adaptive management, in HP's parlance. Another facet of last week's rollout was a set of IT management best practices, including new certification programs and process templates designed to help users align IT with business needs.

The series of announcements are typical for HP, which tends to lump dozens of management software revisions into announcements

"We service the midsize market, and the diversity of hardware and software is huge."

SUBHASH TANTRY, EXECUTIVE VP, CENTERBEAM INC.

NEW PRODUCTS

Autonomic Software

• **Systems Insight Manager:** Cross-platform systems management software that combines HP's Insight Manager 7, TopTools and Service Control Manager applications.

• **OpenView Management Integration Platform:** Integrates management data, initially for Web services and service-oriented architectures.

• **OpenView Select Access:** A set of identity management software and services for authenticating and users.

every six months, said Laura Koztze, an analyst at Forrester Research Inc. in Cambridge, Mass.

Koztze said that HP "is making a lot of strides in rationalizing all the systems management software it has." She gave HP a slight edge over Tivoli in the race to develop autonomic management tools. **■ 42842**

FREE BELL TOOLS

Dell moves into systems management further, announcing free tools: [QuickLink 42878](http://www.quicklink.com)
www.computerworld.com

Continued from page 1

Virtualization

before it will offer support.

"Microsoft's current stance [on support] is a problem," said Eric Kuzmack, an IT architect at Gannett Co. in Silver Spring, Md. Kuzmack said he doesn't know whether the support policy will influence his future rollouts of VMware, but he noted that it makes Linux a more attractive option from a support perspective.

Virtual machine technology "is important enough that the fact that there is not a support issue running Linux [in a virtual environment] weighs on our decision as to what we deploy," Kuzmack said.

Bob Armstrong, director of Internet and information systems at Delaware North Cos., a hospitality services provider

in Buffalo, N.Y., said moving a Microsoft product from a VMware environment to a physical environment takes about six hours.

But he noted that despite Microsoft's stated policy, the company's technical support personnel tend to be flexible in offering some support in a VMware environment. "Six months ago, it was end of story," said Armstrong, adding that now his company is getting less resistance for help.

Michael Mullany, vice president of product marketing at VMware in Palo Alto, Calif., claimed that Microsoft's support policy exists for "competitive reasons." He said support of Windows isn't an issue for Hewlett-Packard Co. and IBM, both of which offer Windows support for products running in the VMware environment.

Eric Berg, a Microsoft group

product manager, defended the policy. "If you look at the virtual machine, in many ways it's like a whole operating system running on top of an operating system," he said. "We don't have visibility into what that software operates, and to us it looks like a black box."

Asked whether the policy was put in place for competitive reasons, Berg said it existed before the Connectix acquisition. "This was consistently our support policy," he said.

While Microsoft has the market dominance and wealth that enable it to cut prices, VMware's strength may be its technological lead. The company says it has several key patents, and its customer base includes 80% of the Fortune 200. Last week, it released VMware VirtualCenter, which allows users to move virtual servers to new physical servers without service interruption.

Brad Day, an analyst at Forrester Research Inc., said

VMware "is 18 to 24 months ahead of Connectix in terms of functionality."

But Microsoft may have an edge in companies that already rely heavily on its systems. Carlos Vargas, a network engineer at Ingersoll-Rand Co. in Woodcliff Lake, N.J., said he has been beta-testing Microsoft's Virtual Server and expects that it will cost less than VMware's comparable product, based on Microsoft's Virtual PC pricing.

But Vargas said cost won't be the deciding factor. He said Ingersoll-Rand is standardizing on Microsoft products, and unless it finds that Virtual Server isn't meeting its needs, he doesn't expect the company to seek out another product. **■ 42840**

Computerworld's Carol Silwa contributed to this story.

Hospitality Suite

The "Hotel" is the main operating system supporting the virtual instances of an operating system, which are known as "guests."

VMware

ADVANTAGE: Supports other Windows or Linux as host.

DISADVANTAGE: Microsoft won't support its products in VMware environment.

Microsoft

ADVANTAGE: Full support for Windows products.

DISADVANTAGE: Supports Linux as guest only. Windows is host.

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Red Hat Users Balk at Enterprise Linux Licensing

Critics say support plan violates spirit of GPL.

BY ROBERT MC MILLAN

Some Red Hat Inc. users are finding it difficult to come to grips with the company's recent decision to provide support only to users who purchase a support license for every copy of Red Hat's server software that they run.

Effective April 30, 2004, Raleigh, N.C.-based Red Hat will cease maintenance of Red Hat Linux 9. As of that date, Red Hat Enterprise Linux will be the only version of the server software available for purchase. But some users said the Red Hat Enterprise Linux support contract is in conflict with the spirit of Linux's software license, known as the GNU General Public License, or GPL.

Although the GPL lets users freely make as many copies of Linux as they like, Red Hat's service agreement compels customers to pay an annual per-system licensing fee in order to receive bug fixes, patches and technical support. The agreement also prohibits the unauthorized copying of Red Hat Enterprise Linux.

Many companies that are migrating to Linux from expensive Unix-based systems are content to pay the per-system licensing fees, which range from \$179 to \$18,000. But some customers, especially those who cluster together a large number of computers, are balking at the fees.

"It's kind of odd that the most advanced operating system that we've got is using the worst financial model from the 1970s," said George Johnsen, chief animation and technical officer at Threshold Digital Research Labs, a digital animation firm in Santa Monica, Calif. Johnsen compared Red Hat's licensing to the mainframe licensing model, saying that it's cumbersome and fails to take into account the economics of large-scale computer users.

Johnsen is typical of a growing class of Linux users: customers who purchase a large number of identically configured commodity systems to

process large amounts of data or to run a widely used "network edge" application like a Web or file-and-print server.

For Lawrence Livermore National Laboratory, which pays Red Hat's professional services group a flat rate for on-site support of Red Hat Linux, the switch to the Enterprise Linux pricing model is daunting. "The base price for Enterprise Linux is \$179 per system," said Robin Goldstone, the leader of the lab's Production Linux Group. "We have 4,000 nodes worth right now. That's almost \$800,000."

For those customers who are resisting the pricing model, Red Hat is showing some flexibility. The company is developing new eight-processor support licenses that are designed to have

It's kind of odd that the most advanced operating system that we've got is using the worst financial model from the 1970s.

GEORGE JOHNSEN, CHIEF ANIMATION AND TECHNICAL OFFICER, THRESHOLD DIGITAL RESEARCH LABS

a more appealing price for high-performance computing users, according to Red Hat spokeswoman Leigh Day. She couldn't say when such a license would be available.

In the meantime, users such as Corey Corrick, director of operations at Web services provider Flamenco Networks Inc. in Alpharetta, Ga., are in a quandary.

"They've kind of forced our hand to, in the future,

move either to a for-pay version of Red Hat or to evaluate a different technology" like FreeBSD to run applications such as the Apache Web server, he said. Flamenco is a heavy user of Novell Inc. products and Corrick said it could take a closer look at SUSE Linux AG, which is being acquired by Novell.

John Young, vice president of marketing at Red Hat, said the company made the moves because corporate users didn't appreciate the frequent release cycles of the standard Red Hat Linux and are aided by the extra features, capabilities and longer release cycles of the enterprise version. **■ 42756**

McMillan writes for the *IDG News Service*. Todd R. Weiss contributed to this report.

DESKTOP LINUX

Making a case for running Linux on the client

Quick Link 42739

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MARYFRAN JOHNSON

Bring On the Scrutiny

POP QUIZ: In a climate where regulations affecting data protection, customer privacy and financial reporting are on the increase, which answer best describes how CIOs should view their new oversight duties?

- A. As a compliment.
- B. As an opportunity.
- C. As a career-enhancing responsibility.
- D. As all of the above.

Yes, you read those choices correctly, and yes, the answer is D. I couldn't have been more surprised, but that's what I heard last week during a panel discussion on "The Scrutinized CIO" at a Society for Information Managers (SIM) executive summit in Chicago.

"I take [the scrutiny] as a compliment and an opportunity," said Frank Modruson, CIO and managing partner at Accenture. "Internal IT investments are large and important for the business. This gives us a forum to talk about where we're investing and how we're driving the company forward."

"I don't mind the scrutiny. It helps positoo me with my peers," added Cathy Brunce, CTO and senior vice president at Allstate Insurance. "All executives are being scrutinized now. If I will sit and take it — and change my organization as needed — that gives me the right to do a little scrutiny on the other side, too."

Indeed, many senior IT leaders may find themselves reporting not only to the CFO but also on him, and on how well company finances measure up in the new regulatory climate. "All of us are thinking differently about where the money is spent," said Brunce. "We're looking at all the transaction flows."

As we noted in a recent story [Sarbantes-Oxley Mandates Lead to IT Certification Push], QuickLink 42512, some CEOs and CFOs are turning to IT organizations to certify



the systems used in processing financial data. New accounting acronyms like SAS 70, an auditing standard, are becoming part of the IT lexicon, and that ever-elusive goal of aligning business and IT seems (dare we hope?) closer than ever. After years of struggling to foster tight relationships between technology and business execs, who would have expected Uncle Sam to step in as the matchmaker? But there you have it.

Of course, the scrutiny extends beyond financial records into the equally business-critical areas of customer privacy and data protection.

"Privacy, security and confidentiality should be on all of our radar screens, and CIOs should be leading here," said John Moon, CIO at Baxter International Inc. and a speaker at the SIM summit. He noted that while IT at the health care and pharmaceu-

tical giant this year has been all about "driving efficiencies and reducing expenses," next year the focus will shift to "enabling business change and growth."

That shift isn't just happening at Baxter, Allstate and Accenture. Everywhere that IT executives gather these days, the talk centers not only on mitigating risks, but also on enabling business change. And however gradually it's improving, the economy seems to be cooperating as it heads upward. In line with the findings of other market researchers, Forrester Research recently polled 818 North American companies and predicted overall IT spending growth of 4% next year. Topping the list of spending plans were "risk mitigation strategies" in security and disaster recovery, but e-commerce initiatives with supply chain partners also ranked right up there as a top priority.

Leading IT organizations are evolving from cost centers and service providers into strategic partners and enablers. "I can see the push everywhere now to converse about IT as an enabler of the business," said Allstate's Brunce.

So bring on the scrutiny, and watch IT rise to the occasion.

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PIMM FOX

His Master's Fax

Voice mail changed the way I think about faxes.

When I returned from Paris recently, I opened my e-mail client and discovered my faxes (so big deal) and a voice-mail message attached to an e-mail (now that's a big deal). I didn't know, until then, that both faxes and voice mail could be received and managed from my e-mail client.

That got me thinking that companies that are still spending money on fax and voice-mail infrastructures are throwing away dollars and time.

The ability to access voice mail and send and receive faxes via your e-mail in-box is so compelling a proposition that it might convince you to stop spending money on a stand-alone fax infrastructure.

That infrastructure can be extensive.

Phone lines, phone support and servers cost money and take up time and space. In addition, your twosomething IT geeks don't want to be messing with fax systems; they'd rather be working on Web architecture.

So consider exploring in this direction: outsourcing your fax and voice-mail service to a company like J2 Global Communications.

Hollywood-based J2 already has 2,000 corporate accounts and 30,000 end users. Here's the technology behind the service it offers many of them: Servers at one of J2's 60 collocation sites receive faxes and answer calls. J2 translates fax images to TIFF files and voice mails to WAV files and then attaches the files to e-mails and forwards them to its customers.

With J2's Web-based management tools, you can centrally administer and provision fax numbers within minutes around the clock and around the globe. You no longer need to spend time calling phone companies to acquire phone lines, nor do you need to deploy machines or technicians. It's all done online. And assigning numbers to users is easy, with simple comma-separated files. It's also possible to integrate the



service with your ERP system for companies that may fax you orders.

There are some additional features for security or working with a VPN. For example, health care, financial services and legal firms that want to encrypt files can use a server from Redwood City, Calif.-based Tumbleweed Communications Corp. This acts as a gateway at a J2 location and generates a domain-level public-key certificate that's sent over the Internet to be decrypted by a similar gateway at the user's site. The content is then distributed via the normal e-mail server. VPN users can configure a router and drop it into the J2 data center, and all faxes will be funneled through the router to the user's VPN.

Right now, outbound traffic is limited to 10MB, and inbound capacity is about 200 pages. That should be enough to handle a PowerPoint presentation that argues for doing away with your current fax — and voice-mail — technology. ☐ **42896**

MICHAEL
GARTENBERG

A Time to Wait, a Time To Deploy

TECHNOLOGY is a constant stream of advances. Thousands of products are released each year promising some way to either increase productivity or lower business costs while attempting to deliver a sound ROI. However, it often seems that many technologies are released before they're ready for the mainstream and that pains end users are supposed to achieve are negated as a result of poor design, buggy code or just being too far ahead of the technology curve. This is the pitfall of the early adopter, but by adhering to certain adoption guidelines, you can help avoid this pain and deploy technology effectively.

The first guideline is simple: There is a worldwide market of 50,000 for anything. Unless your organization is composed entirely of parts of the group of 50,000 (folks who install operating systems on a Sunday afternoon as a form of entertainment), you need to look beyond technology for the sake of technology and see if what you're

about to deploy falls into one of three categories. If it doesn't, you might want to wait for Version 3.0.

1. Viable differentiation. Is the product really different?

When Apple introduced the Macintosh, the product could easily be discerned by anyone at a distance of 100 paces as being vastly different from anything else on the market. Early Macintosh buyers rarely felt buyer's remorse, because they could not do things that they couldn't do previously.

2. A measurable increase in productivity.

Can you objectively chart a productivity boost? Mobile computing devices such as notebooks, cell phones and BlackBerry e-mail clients all paid back early adopters in gains that were easily quantifiable. Of course, you want to make sure that those gains apply to you. For example, if your users rarely need to leave their desks, you won't



see the same gains on a mobile e-mail device that a road warrior might.

3. Justifiable TCO. If it isn't noticeably different or won't increase productivity, new technology had better save you some money. Technology such as software management systems have significant upfront costs, but measurably lower TCO.

There are also three things to watch out for.

1. Upstream platforms. Many new technologies want to

achieve status as a de facto platform. Many vendors feel that if they add an API set, they can then call a product a "platform." The reality is that few technologies will ever achieve true platform status, and it's best to beware of any technology that purports to be a new platform or paradigm (especially if it can't meet the criteria above).

2. Measurable but hard-to-define performance gains. Though vendors often claim vast speed differences, remember that performance that can be measured with a stopwatch might not actually be noticeable in real-world use.

3. Partial solutions. Finally, some products seem like good ideas but are really only partially created to fruition. Apple's Newton is a great example. It was arguably one of the finest PDA operating systems ever created, but it lacked the seamless synchronization of data (an oversight corrected by Palm, which built an operating system that was a success even though it had only a fraction of the Newton's power).

Many businesses have survived the economic downturn in part by cutting back on IT spending. The IT organizations at those companies need to be even more careful about how they deploy new technologies. ☐ **42891**

WANT OUR OPINION?

More columns and links to archives of previous columns are on our Web site: www.computerworld.com/columns

READERS' LETTERS

Blade Beginnings

THE VERY FIRST blade servers, from RLX, were actually designed to solve the problem for the Web hosting Web serving market segment ("Money Toward Tomorrow," QuickLink 47569). A rack full of 336 gigs, they could run 336 servers in a rack safely! RLX ServerBlade 633s consumed only about 3.3 kilowatts at average load, 2.4 kilowatts at idle, and 4.5 kilowatts at absolute peak, fully loaded with everything spinning, even

though that was highly unlikely to happen. The problem was that the venture capitalists that funded RLX wanted more than the Web market segment, and so the company changed its strategy to go after the mainstream server market and has ended up in a head-on collision with the Tier 1 vendors. I know all of this because I was the person who came up with the concept, co-founded RLX and designed its first two hardware platforms. Christopher G. Hipp
Redwood City, Calif.

SSN Can Identify but Not Authenticate

THE PROBLEM with Social Security numbers can't be their owners, but their misuse ("Nine-Digit Dilemma," QuickLink 47704). The SSN is a reasonably good identifier. True, it means alien, and it's often abused, by a military spouse in need of health care, for example. But for the most part, my SSN does a pretty good job of clearing up the issue of which Michael Martin I am.

The real problem is that we try to use the SSN for authentication, as if knowing my SSN proves you are me. But I need to disclose my SSN to anyone with a legitimate need to identify me. Anyone who needs me to prove that I am the Michael Mar-

tin I claim to be needs to demand some other type of proof.

We need to accept the conflict and begin to address the issue of how best to authenticate ourselves in various situations. Simply providing my identifier will never be the appropriate means of authentication, no matter how thinly we divide up identifiers. Even if I use my SSN only with the Internal Revenue Service, none of the IRS can still impersonate me.

Michael K. Martin
Director, medical informatics, M&M Informatics, Columbia, S.C., martinkm@miminformatics.com

What's the Word?

THE COLUMN "Stop 'Gathering' IT Requirements" (QuickLink 47565) describes no real problem other than semantics and serves only to let the flames for business users and inexperienced IT workers grow. I don't believe we should leave any kind of structured requirements-gathering process. The article makes too big a deal of the word "pathology," as if it's some sort of technical blemish. It's just a word that is commonly used in the industry and has been for many years. Even business users know that and don't seem to have a problem with it.

Rick Woods
Irving, Texas,
rickwoods@yahoo.com

Beware of Analysts' Outsourcing Advice

THE ARTICLE "Market Research Provides Contract Credibility Concerns" (QuickLink 42031) acknowledged the widely held view that IT market research firms like Forrester and Gartner have been producing biased, vendor-sponsored research for some time.

What was not addressed is the fact that these same firms have

been leading the charge on offshore outsourcing. For the past year or more, these firms have bombarded the media with their research and projections on offshore outsourcing. It isn't widely reported that Forrester, Gartner and probably others have their own offshore outsourcing divisions, which may seek to profit from the same "research" they generate. This is unethical, self-serving and a huge conflict of interest.

Many CEOs have made the unwise decision to offshore their IT departments based mainly on the self-serving propaganda generated by these firms.

Robert Kneaflex
Hawthorn, Ill.,
rkneaflex@comcast.net

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1. IHS Group, July-August 2005, U.S. retail shipments.

KNOWLEDGE CENTER STORAGE

11.17.03



The Story So Far

David A. Patterson, who led the team that developed the idea of RAID storage at the University of California, Berkeley, describes the thinking behind RAID. **Page 28**



Opinion

Disk capacity is doubling every year. Prices are dropping. What's not to like? Plenty, says columnist Mark Hall. **Page 44**

The Next Chapter

Industry visionaries say they foresee cell phones that pack a terabyte of storage and "object-based storage" that replaces databases. **Page 56**

EDITOR'S NOTE

IT'S CLEAR that data storage is more important than ever. Take a look at these factsheets (surely headed to a PowerPoint slide near you):

- Globally, there was a 30% increase in stored information (of all sorts) from 1999 to 2002. Storage on hard disk drives rose 144%. (Source: University of California, Berkeley)

- "Storage is the fastest growing capital cost within the data center and in many enterprises," (Garbarino Inc.)

- Data centers will double their storage needs every 18 to 24 months. (Garbarino)

- Federal regulators have discovered IT storage, big time. (Computerworld)

Actually, government agencies such as the IRS have been concerned about records storage since the dawn of the Computer Age. What's new is the accelerating pace of records management laws in the past few years. Not only are there the well-known Health Insurance Portability and Accountability Act and

- Sarbanes-Oxley Act, but the Food and Drug Administration also heavily regulates record-keeping in the drug, medical device and biotech industries. And the SEC continues to require broker-dealers to use "non-rewritable and non-erasable" storage technology (QuickLink 38369).

- The general trend - described in the special report that follows - is that the new laws require companies to store more data, for longer periods of time and in a form that can't be tampered with.

But don't take my word for it - or the word of storage vendors that see the new laws as a

- great sales tool. Instead, work closely with your company's legal department to find out how your storage infrastructure needs to adapt to the new rules of the game. **■ 42525**

Mitch Betts is Features editor at Computerworld. He can be contacted at mitch_betts@computerworld.com.



The New Rules Of Storage

New regulations have IT managers scurrying to make sure their storage systems comply.

KNOWLEDGE CENTER STORAGE

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Mitch Betts is Features editor at Computeword. He can be contacted at mitch_betts@computeworld.com.

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The New Rules Of Storage

New regulations have IT managers scurrying to make sure their storage systems comply.

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McAfee Solutions. Think about what you protect.

Network Associates

David A. Patterson led the team at the University of California, Berkeley, that developed the idea of RAID storage. In an interview with Frank Hayes, Patterson recalled the beginnings of his RAID project in 1987.

"W HILE I JUST BEEN working on RISC processors, and we consciously said, 'Processors are going to start getting fast, improving faster than they have in the past. So what are we going to do about I/O?' That was one motivation.

"The other one was that Randy Katz [one of Patterson's colleagues at Berkeley] got a Macintosh, and it had a hard disk in a separate box next to it. And he said, 'That's kind of interesting; here's a much smaller disk than I'm used to. What could we do with that as a building block?'

"So we held a graduate course where we started off with some rough ideas, and then we and the graduate students

—Garth Gibson, Pete Chen, Ed Lee, Ann Chervenak, Ethan Miller — met and talked and read papers, and the

The Story So Far

Redundant Arrays of Inexpensive Disks turned out to be expensive — but dependable.

ideas evolved from there.

"But when we tried to tell people our ideas, they couldn't understand. They'd say, 'Oh yeah, that's the same thing that IBM's been doing forever in terms of mirroring.' Or, 'Oh yeah, Thinking Machines, they've got a product in this area.' And so when we tried to explain things, they assumed what we'd done had already been subsumed by other work.

"That motivated us to write a paper [The Case for Redundant Arrays of Inexpensive Disks]. It advocated that we should be replacing these big disks by lots of small disks. Basically, a big, relatively thick disk that had to spin fast is much less efficient

than lots of small disks, and we get all these benefits in terms of volume and footprint and power. We submitted the paper to the database conference SIGMOD, and Garth Gibson [the lead graduate student on the project] and I went to a short course

that was given at Santa Clara University by Al Hoagland, who was kind of the godfather of the disk industry. We came with 20 or 30 copies of our report and handed it out at that meeting, and that was a good thing to do. The paper just clicked. It was a good time, I guess, for that set of arguments.

"We built the RAID 1 [in 1989] to try the ideas in software. For RAID 2 [in 1993], we said, 'Let's try to build a high-performance I/O system that connects over a network.' Then at the end of the project, we had a little demo where we pulled the disk out and the thing kept working.

"We were still performance-oriented, thinking RAID was for performance, so we were shocked to see somebody write this up in Byte magazine. The PC community was obviously not so performance-oriented as it was dependability-oriented, and they thought, Hey, less-expensive dependable computing.

"It really just took off after that.

EMC decided to build mainframe storage out of PC disks. Compaq had RAID early, and Data General. And of course IBM had its own. We didn't know IBM had its own RAID 5 set of ideas in the AS/400 line. IBM had completely independently done the same RAID part of the ideas but used larger disks.

"One of the surprises about RAID was it was so expensive. The 1 in the name was when we coined the term was for inexpensive disks. But the system was so expensive, that was kind of awkward for marketing people. So Randy blessed the change to independent for 1. Since the RAID boxes weren't cheap, that was probably a better name.

"The current project I'm working on is ROC, Recovery-Oriented Computing. With the RAID stuff, we were always thinking performance, but obviously, dependability

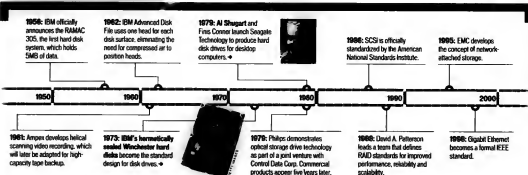
is the reason people are doing it. People get mad if their program crashes, but they just go berserk if they lose data. The ROC philosophy is recovering fast when outages happen. That's a different engineering ethic. Hardware will break, software has bugs, people will make mistakes. And if you believe that, then it makes sense to recover fast, rather than just try to make things that never break." □ 4229



DAVID A. PATTERSON led the team at the University of California, Berkeley, that developed the idea of RAID storage.

IN THE ARCHIVES

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Regulated Storage

New rules are forcing companies to buy more storage and develop new policies around its use. By Robert L. Scheier

DRIVEN BY CORPORATE scandals and privacy concerns, new laws and regulations are requiring organizations to store more data, keep it longer and make sure it's accurate and easy to retrieve.

In response, customers are buying more storage capacity and developing new storage policies to ensure that they comply with regulations such as the Health Insurance Portability and Accountability Act and the Sarbanes-Oxley Act.

Here's a look at these two storage-intensive regulations and how some organizations are keeping to the letter of the law while getting business benefits from their compliance dollars.

Health Insurance Portability and Accountability Act (HIPAA)

WHAT IT ENTAILS: Encourages the use of electronic transactions to increase efficiencies in the health care field. Security rules require health care providers and insurers to protect patient information and to ensure its availability in case of disasters. Requires medical records to be kept in their original form

for two years after the patient's death.

INDUSTRIES AFFECTED: Health care providers, health care insurers and health claims clearinghouses.

ENACTED: August 1996

COMPLIANCE DEADLINE: April 21, 2005, for most covered entities; small health plans have until April 2006.

REGULATION ROAD MAP: Experts advise IT departments to consider new optical technologies for long-term storage of records and say productivity and customer-service improvements could help pay for HIPAA compliance.

Peter Gerr, an analyst at Enterprise Storage Group Inc. in Milford, Mass., says HIPAA's requirements for long-term storage of medical records will force health care providers not only to buy more storage, but also to create policies to manage it. A typical hospital generates 50TB to 70TB of magnetic resonance imaging and computerized tomography data per year and, in some cases, will need to keep and be able to access that data for decades.

USER APPROACH: For Northwestern Memorial Hospital in Chicago, one of the first steps toward meeting HIPAA Continued on page 36



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Continued from page 32
regulations protecting patient information was to buy a IZTB EMC Corp. Symmetrix server.

Buying the storage-area network (SAN) to store and manage "things as mundane as e-mail or user files" was only the beginning, says Mike Carper, Northwestern Memorial's director of technology management. The hospital used HIPAA as the springboard to upgrade its network, its access control software and even its 5,700 client PCs to a common version of Windows XP. Users can now save data onto the SAN, not their local hard drives.

"We're using HIPAA as a tool to help develop policies around data storage," which was a task the hospital had to confront, with or without the regulations, says Carper.

Northwestern Memorial is also using HIPAA as an opportunity to upgrade its overall security capabilities. It's using Novell Inc.'s NetWare to provide role-based access-control and audit capabilities, along with the ability to audit which users have accessed which files. Carper says the hospital is also using Novell's ZENworks management software to provide role-based application access, so that data entry clerks log on, for example, they see different sets of applications than physicians see.

Brooklyn's Maimonides Medical Center migrated to two geographically separated SANs about two and a half years ago, says Mark Moroses, senior director of technical services.

Complying with HIPAA wasn't his aim at the time, he says. Moroses' goal was to handle the growth in data in his electronic medical record application and meet existing state and federal requirements to store patient records for at least seven years.

Meeting HIPAA's requirement for audit trails was a "pretty straightforward" process of "keeping more log files for a longer period of time," says Moroses. The disaster recovery requirements of HIPAA were met by using the second SAN with a replicated version of the patient data. Using an IBM Fast Storage Server managed by DataCore Software Corp.'s SANSymphony allows him to mix and match drives from different vendors as the price of storage falls and the medical center's needs grow.

As part of its HIPAA compliance, the Office of Group Benefits in the Louisiana Department of Natural Resources bought a STB IBM Enterprise Storage Server to consolidate data that had been stored on approximately 20

[Buying a SAN to store and manage] things as mundane as e-mail or user files [was only the beginning.] We're using HIPAA as a tool to help develop policies around data storage.

MIKE CARPER, DIRECTOR OF TECHNOLOGY MANAGEMENT,
NORTHWESTERN MEMORIAL HOSPITAL

servers, says CIO Riwwan Ahmed. The SAN, along with policy-based access-control software and fingerprint scanners to authenticate users, cost about \$750,000.

Yet Ahmed says, "We've saved at least as much as we spent" in increased productivity and improved customer service. He says he hopes to eventually use the centralized database to provide instant claims payments to doctors, which would cut administrative costs and "allow us to attract more and more providers, and the more providers we have, the more members we can attract."

Sarbanes-Oxley Act

WHAT IT ENTAILS: Tightens corporate reporting and audit practices; requires the retention of all working papers, correspondence and communications about a public company's financial statements for seven years.

INDUSTRIES AFFECTED: Accounting firms that audit the financial statements of publicly traded companies, although the companies themselves may also wish to retain the records.

ENACTED: August 1, 2002

COMPLIANCE DEADLINE: Most public companies must comply by June 15, 2004; smaller U.S. business and foreign companies must comply by April 15, 2005.

REGULATION ROAD MAP: Experts suggest that IT departments work with their business managers to proactively develop policies and storage architectures that aid compliance. They should consider new optical and disk-based storage technologies as a complement to tape for archival storage.

Gerr recommends that business and IT managers work together to "understand the requirements that affect you. Identify the data and content types that are required to be retained and for how long, and develop auditable processes" to ensure that data is protected.

New technologies such as ultra-dense optical and relatively low-cost, high-performance Serial ATA-based disk drives can be used to create multiple tiers of storage, says Gerr. These technologies, along with policy-based storage management tools, allow customers to "tier applications and storage infrastructure by type, value, performance, availability needs or other meaningful criteria," he says.

"Fibre Channel or SCSI [storage] might be Tier 1," says Gerr. "Serial ATA-based storage could be Tier 2; tape might be Tier 3." Each successive tier will consist of less-expensive, but slower, storage that allows companies to move data to different storage levels as their importance changes over time.

To comply with Sarbanes-Oxley and other regulations, Gerr says, a company might need to be able to retrieve financial statements very quickly in the first 30 days after the end of the quarter and thus keep that data on the first tier.

"After the first 30 days, you may need to keep them online until the quarter ends, but since you don't need to access them regularly, you may want to move them" to Tier 2 storage, says Gerr. After the end of the quarter, when the need for quick retrieval of the data becomes even less likely, the company might want to move those records to lower-cost but slower-performing tape in Tier 3.

Gartner Inc. analysts Debra Logan and Rich Mogull argue that the first priority for storage or IT managers should be understanding which applications and which technologies are most critical to the law's goal of "improving transparency and accountabil-

ity in business processes and corporate accounting."

"The only technology category that the law mentions specifically is 'electronic communications,' but we know that financial accounting systems, enterprise resource planning, general ledger and supply chain management systems will all be subject to the regulation," wrote Logan and Mogull in an October report. Since Sarbanes-Oxley is primarily concerned with corporate financial processes, they say, "CIOs should pay the closest attention to ERP and other financial management systems."

USER APPROACH: Tektronix Inc., a Beaverton, Ore.-based manufacturer of test, measuring and monitoring equipment, won't need new hardware or software to comply with Sarbanes-Oxley, says 15 director Callie Gates. The company already purchased a SAN as well as automated off-site tape backup and archiving software from Outertay Technologies Inc. in Campbell, Calif., as part of an information life-cycle management plan begun in 1999.

The strategy was spurred by a series of divestitures that forced Tektronix to reorganize how it handles information. While the changes Tektronix has already made put it in good shape to comply with Sarbanes-Oxley, Gates says the law will force her company and others to formalize their procedures for safeguarding data.

"Everyone has controls around this process, and the auditors document them at a high level," she says. But producing a detailed list of those processes "has never been a requirement for corporate America before," says Gates.

Gartner research conducted before Sarbanes-Oxley was enacted showed that while companies may have had adequate controls over paper records, their control of electronic documents was inadequate.

Although good record-keeping practices aren't specifically mentioned in these acts, "the implications for records management are clear."

□ 42401

Scheier is a Computerworld contributing writer in Bryn Mawr, Mass. He can be reached at rscheier@charter.net.

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RICK ALLEN, service line director for IS operations at Gwinnett Health System in Lawrenceville, Ga., manages just about every storage medium under the sun, from Fibre Channel networks to optical disk to tape libraries. But pressured by HIPAA regulations and seeking cost savings for his company, he's working to consolidate and automate his records management process.

"I'm trying to consolidate all that because keeping up with it is making me pull my hair out," says Allen. "Consolidation will allow me to effectively manage storage allocations and data retention, and minimize the amount of data stored."

Regulatory compliance issues and business needs are challenging IT managers to reinvent their storage strategies and driving a move toward information life-cycle management (ILM), a nascent concept for managing data in a policy-driven, automated fashion from cradle to grave. ILM is an outgrowth of an older and more well-known concept, hierarchical storage management, the automated management of data, from file backup to archiving.

The goal of ILM is to put certain types of data on appropriate types of storage devices and media depending on how long companies must keep it or how soon they might need to retrieve it. Another key component is automated deletion of data when regulators no longer require it be saved.

Today, however, ILM is still in its infancy — it's a collection of disparate



Regulatory compliance is driving a nascent concept called information life-cycle management for managing data from cradle to grave. By Lucas Mearian

management applications and hardware that combines policy-based storage management with online storage, nearline storage and archive tape storage. In a post-Enron world, companies are using these bits of technology to make sure that data is stored in compliance with new laws and purged at the right times, and that records-retention policies are enforced.

The problem, as Gartner Inc. analyst Ray Paquet defines it, is that "today we have storage, period. Information is put on storage without any concept of its value." On average, Paquet says, 70% of all data on disk is untouched after 90 days. So when you consider how expensive high-end Fibre Channel storage devices are — anywhere from 9 to 15 cents per megabyte — it makes sense for storage administrators to migrate data to less-expensive media as fast as possible. Serial Advanced Technology Attachment (ATA) drives, for example, are one-tenth the cost of Fibre Channel drives, Paquet says.

"That's big dollars. And the data is still on disk, so it's immediately accessible," he says.

Here's a look at how four companies are using storage technology to meet regulatory requirements, while keeping costs down.

A Call to Consolidate

At Gwinnett Health System, storage administrators are dealing with the requirements of the Health Insurance Portability and Accountability Act, which mandates that radiology images and other records be saved for set periods of time — in some cases, for the life of the patient. Physicians must also be able to easily and quickly access those records, which means they must remain online for years.

To meet those demands, Gwinnett uses a mix of 130 servers (Dell's and Hewlett-Packard's) backed up by a storage-area network and direct-attached storage. Allen says his archival systems include optical disk and three tape library formats: Mammoth 2, linear tape open and digital linear tape.

The problem is, Gwinnett's storage architecture, like that of many enterprises, is made up of islands of capacity without any policy-driven system for migrating data between systems based on the importance of each document and how long it should remain on one form of media.

"We're converting data off the WOMM drives and onto the SAN," Allen says. "HIPAA says we have to keep files for a minimum of seven years. Some of the

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"Patient safety is a big push. We've got to be able to provide our physicians with all the information they need to make good decisions. I've got to have some way to manage [that information]," he adds.

A Drive to Save Money

For Bob Massengill, manager of technical services at Wake Forest University Baptist Medical Center in Winston-Salem, N.C., ILM is less about regulations and more about cost. The Medical Center has 20 subsidiary or affiliate hospitals and runs 87 satellite clinics throughout the region with about 11,000 employees.

"Everybody's scrutinizing everything you spend now, so you'd better make sure everything you spend is invested at the right level," Massengill says.

Two years ago, Massengill set up a SAN powered by a refrigerator-size EMC Corp. Symmetrix storage array. The SAN worked well, says Massengill, but after about a year, he found he couldn't justify saving everything from e-mail to old X-rays on disk that cost him up to 15 cents per megabyte. So earlier this year, to achieve lower total cost of ownership, Massengill installed a storage array based on cheaper ATA disks, also from EMC, and upgraded his Storage Technology Corp. enterprise-class PowderHorn tape library to in-

clude a virtual tape array or a disk array that mimics tape for faster backup. The medical center now has 45TB of capacity, but Massengill says he still performs data migration without the use of policy-based tools. "We're using Legato's software for backup. It's not totally manual, but it's not totally policy-driven either. We have scripts that say when to dump data to tape."

Massengill says he now needs tools to help him classify data to decide whether and how long it should be on high-cost primary storage disk, near-line storage or a tape archival system. "I'm struggling with that. I guess the big thing that is missing is nobody has a clear-cut, true ILM product on the market today. I need to determine what kind of data it is and how often it's been used," he says.

For example, Massengill says he's working on setting up automated policies for e-mail storage. That will free up primary disk storage space by migrating less important data onto the correct medium, he says.

Massengill says it will take him about 12 to 18 months to complete data analysis and policy development.

Lock It and Back It Up

More than a year after the Sarbanes-Oxley Act for corporate accountability was passed, the legal and IT departments at Chicago-based Grant Thornton LLP are still hammering out just what data needs to be stored where and for how long.

Dave Johnson, director of IT at the global accounting and auditing firm, says he has been meeting twice a month with the firm's compliance department to work out storage requirements. The group evaluates data by line of business

and type of client in order to best address the legal guidelines, he says.

Johnson is keenly aware that the Sarbanes-Oxley Act is requiring public accounting firms to retain documents from publicly traded companies for seven years, two years longer than previously required.

For now, Grant Thornton uses services from Connected Corp. in Framingham, Mass., to back up all desktop applications and meet regulatory requirements. Each time a user logs in, any file updates are automatically transmitted via virtual private network (VPN) to Connected, which "ensures we don't have those files any more and the legal department is the only one that can get them," Johnson says.

Find the Right Technology

Charles Bennett, vice president and director of compliance at Horner, Townsend & Kent Inc., the brokerage division of Penn Mutual Life Insurance Co. in Hingham, Mass., sits on a regulatory compliance committee at his firm that includes IT management. The group is "constantly looking for ways to make the firm's records retention operation more automated and efficient and at a better price point," he says.

"Clearly, one of the things I end up doing is giving [IT] people a sense of the importance of the ability to retrieve data and how fast we need to do that," says Bennett. "The [U.S. Securities and Exchange Commission's Rule 17a-4] requires us to be able to retrieve any document within 24 hours."

The firm's compliance committee evaluates whether data being stored on an IBM enterprise-class SAN should eventually be written off to tape or optical disk, which is one op-

Typical network-attached storage uses either the NFS or the CIFS protocol to store metadata separately from a file on an array of disks. Each time a request is made, that file system uses the metadata to find the file.

Object-based storage, however, breaks a file or block-level data into random-size chunks called "objects," which carry file data, metadata and other attributes, such as quality of service. Those objects are striped across an array of disks, and each client, or even disk drive, has the ability to access those files directly. But to a user, it all looks like a basic file system with a directory tree. Each client server then receives an agent that allows it to directly seek out the data. The concept isn't new; mainframe computers have performed ILM functionality for decades.

But when it comes to storage, "you've got to put more of the pieces together," Paquet says.

—Lucas Mearin

tion for meeting the SEC's requirement that all electronic documents be stored on WORM technology.

Bennett says the current process used to determine whether an electronic document is regulated by the SEC is manual and arduous. Once a regulated document is identified, it must be off-loaded from the SAN to optical disk and then shipped to Boston-based Iron Mountain Inc. for off-site storage. The problem comes in retrieving that data, which can take days, Bennett says.

"We struggle over the most appropriate technology solutions for both the business' need and risk," he says. "If you're addressing a regulatory request for documents, you sure don't want to give someone a date range and have them paw through all your communications."

Bennett says he expects to purchase Iron Mountain's e-mail surveillance service, which will allow his company to transfer all e-mails to an off-site storage facility via a VPN and then perform overnight via a Web browser equipped with content management software. "My staff today spends 15% to 20% of their time reviewing e-mails," he says. "We expect with this supervisory module that we'll cut down to 5%."

But, as Gartner's Paquet points out, e-mail is only one piece to the document retention equation. "Think vendors will start to glue the systems together in the next year to 18 months," he says. "The question is, When will it be completed? That's at least three years out. If not five years out."

In the meantime, users will continue to cobble together their own solutions, piece by piece. **■ 4222**

Market Outlook

■ **IBM, Hewlett-Packard Co., EMC, Hitachi Data Systems Inc., StorageTek and Sun Microsystems Inc.** are key players in this market, as well as storage management software companies such as Veritas Software Corp. and Legato Systems Inc.

■ **Still missing from the storage automation equation is integration with front-end applications, such as Microsoft Exchange, Oracle and SAP.** One example of how storage vendors are moving forward lying more tightly into front-end systems was EMC's October announcement that it will acquire content management vendor Documentum Inc. in a \$7.2-billion stock transaction. The acquisition is intended to help EMC succeed in its ability to manage unstructured content such as e-mail.

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Keeping a Safe Distance



IP storage allows long-distance data replication and recovery, but the technology is emerging slowly. By Matt Hamblen

HURRICANE ISABEL and the fires that recently devastated Southern California have provided storage managers with more evidence that it's a good idea to back up data to a second data center scores or even hundreds of miles away.

To keep the costs of replication affordable, a handful of banks and brokerages began testing long-distance IP replication for data recovery two years ago, and interest in the technology has grown among other types of businesses since then.

Even though long-distance IP storage is now available, some storage managers still resort to bulk replication on tapes, which might be sent overnight to a remote site for safekeeping. But managers usually prefer keeping replicated data on storage disks for quicker recovery. "Recovery from tape is too laborious," says Robert Gray, an analyst at market research firm IDC.

A dedicated optical or copper connection between data centers could be used for replication but would be costly to lease from a carrier and prohibitively expensive to build privately, Gray says.

Users of IP for long-distance storage have found that a conventional Internet connection can be used for e-mail and other purposes during the day and as

a replication highway at night or at other low-traffic times, Gray says. The only added cost is for a switch, available from several vendors, that converts data on the Fibre Channel storage protocol to IP using the Fibre Channel over IP (FCIP) protocol. The pipes between primary and secondary storage facilities can be fiber, copper or even wireless, depending on the distance.

The use of IP in long-distance storage is really just starting, despite the deployments that were publicized two years ago, says Steve Duplessie, an analyst at Enterprise Storage Group Inc. in Milford, Mass. The 2003 market for switches and related gear to convert Fibre Channel to FCIP will be about \$300 million, with 90% of that total shared among McData Corp., Cisco Systems Inc. and Computer Network Technology Corp., he says. There are probably 500 implementations of long-distance IP replication under way or up and running, Duplessie estimates.

Close Calls

Steinbach Credit Union in Steinbach, Manitoba, in January began setting up an IP-based data recovery center in Winnipeg, 35 miles away, says network administrator Denis Van Dale.

The credit union, which has 35,000 customers, decided to spend \$350,000 (Canadian) to do replication at a remote site in the summer of 2002 after two power outages during thunderstorms that left water in the basement of its office, Van Dale says.

"It could have been a disaster of major proportions," with potential damage to the tape backup system, he says. When he learned that a branch office was opening in Winnipeg, it became the logical choice for replication. The backup center was ultimately reached by wireless IP, using high-speed routers at each end and a transmission tower midway between the two sites.

The project provides real-time backup of all data in addition to disaster recovery. The wireless Ethernet connection has saved the credit union about \$50,000 (Canadian) per month compared with a wired connection, and there are administrative savings as well, so the return on investment will be reached in about a year, Van Dale says.

Steinbach uses IP switches from Nishan Systems Inc. (which was purchased by McData in September), clustered storage gear from Xitotech Corp. and radios from Proxim Corp., Van Dale says.

Taking a different approach, the Cancer Therapy & Research Center in San Antonio 18 months ago began replicating data over IP to a research facility

22 miles away, in another part of San Antonio, via an optical connection.

The research center setup uses Cisco storage routers that connect to a storage-area network using Fibre Channel Clarifio disk arrays from EMC Corp., according to Chief Technology Officer Mike Luter. The optical connection had been used for IP telephony and data applications before the replication began, he says.

Luter says that "the ROI is not really in dollars but in patient care," which is enhanced because there is very little delay if a server fails — perhaps only 10 minutes, compared with hours before the data recovery project was completed. "We're able now to ensure we don't interrupt treatment," he says.

Some companies have ambitious plans for the technology. For example, Sprint Corp. in July announced a prototype of a storage network over FCIP from Overland Park, Kan., to Burlingame, Calif., and back to Overland Park, a total of 3,600 miles. The pilot used Hitachi Data Systems Corp. storage and Cisco SAN switches and was designed to show that Sprint could offer such a service to customers at "much less cost than running dedicated, single-purpose fiber," says Ray Dickensheets, a member of Sprint's technical staff. The network won't be limited to fiber-optic cable and could run over copper circuits, he says.

"All these efforts are aimed at getting replication outside a metro area," says Dickensheets. **■** 42292

How Far Is Far Enough?

To design an effective IP-based data recovery system, Steve Duplessie, an analyst at Enterprise Storage Group, recommends that a secondary site be more than 100 miles from the primary data center. "We'd prefer 1,000 miles, because bad stuff happens," Duplessie adds.

Since Sept. 11, 2001, the government has sent mixed signals about data recovery. In a 2002 interagency white paper, the Federal Reserve, the Office of the Comptroller of the Currency and the U.S. Securities and Exchange Commission recommended a 200- to 300-mile separation between primary and backup data centers. But in guidelines for financial institutions issued in April, the agencies didn't recommend a minimum distance. Instead urging companies to make provisions for the recovery of operations within a business day, with the "goal of achieving recovery and resumption within two hours after an event."

A 35-mile separation works for Steinbach Credit Union in Manitoba, says network administrator Denis Van Dale. "We have no hurricanes here, only storms and fires, and no terrorist attacks yet," he says.

Dan Huberty is director of IT at Minneapolis-based Carlson Companies Inc., which is developing storage virtualization and long-distance IP between its data centers. He says he feels that 60 miles is enough, given a study showing that weather events, including hurricanes, aren't likely to reach much farther than that in their impact.

—Matt Hamblen

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ISO

SNAPSHOTS

Market Interest

Are you interested in buying
iSCSI products in the future?



BASE: 292 IT storage managers at
companies with more than 40 employees

Source: Computerworld Research, 10/20/03

In Tandem

In the next year, many IT managers plan
to undertake storage and server virtual-
ization projects at the same time.



BASE: 165 North American IT managers
who plan to undertake a virtualization
project in the next 12 months

Source: Computerworld Research, 10/20/03

Vertical Storage

The five industries that will spend the
most on storage services in 2004:



MARK HALL

Unpleasant Success

THE SURLY IRISH PLAYWRIGHT George Bernard Shaw once observed, "It's just as unpleasant to get more than you bargain for as to get less." He must have been thinking about mass storage systems.

At all levels — disk, array, NAS and SAN — data storage devices are expanding their capacities faster than most of us can keep pace. Today, business laptops from Dell come equipped with 40GB drives as standard. In 1999, the regular configuration averaged 4.8GB. Since 1990, disk drive storage capacities have outpaced Moore's Law, doubling every year instead of the 18 months that it takes for chips. Currently, IBM's researchers have pegged 20TB as today's theoretical limit of a single drive's storage limits. But many others, as noted below, believe that goal will easily be smashed.

Prices are tumbling, too. According to American Scientist, "At a few tenths of a cent per megabyte," digital data storage has become much cheaper than paper as a medium on which to create and hold information.

So cheap, in fact, that it's likely more of us will follow Microsoft researcher Gordon Bell's lead by cramming our entire lives — everything from the books we read to every e-mail we send or receive — onto a single, portable disk drive. He estimates in his MyLifeBits project that a person's life that was filmed 24 hours a day for 100 years could slip into a single 100TB drive, which is something he and others believe we have "every prospect of reaching."

Although I'm certain Bell's life is worth chronicling, most of you will be storing corporate, not personal, histories in enormous detail, not only because it's possible and cheap, but also because the government mandates that you save more and more company data. Uncle Sam also wants you to access it on demand. But that could be a problem.

Setting aside the database and data management issues for dealing with the humongous data stores we'll face, consider the simple matter of physical access to the stored data. According to Jim Gray, another noted Microsoft researcher, while drive capacity has been doubling for nearly 15 years, physical access rates have improved by a mere 10% annually during the same period. As a result, I/O is once again becoming a bottleneck for application rollouts that depend on using larger and larger data stores.

Luckily, you can design your systems to bridge the gap until access times catch up to the data stored, assuming it's even possible. One way is to use more memory in application servers that are retrieving data from these massive, but lollygagging, drives. RAM is relatively cheap, so in many cases it will be the right

solution. Happily, 64-bit operating systems and chip sets will become more widespread in the coming years, giving us headroom for cache expansion beyond the 32-bit system limits most of us experience today.

This approach also lets companies run big iron that can continue to serve lots of users with vital applications. It makes for a more secure computing environment and a data center that's easier and less costly to manage.

You could also solve your I/O logjam by distributing today's centrally managed applications farther to the edge of your network or even down to the desktops themselves, probably via Web services. This technique improves performance because data reads and occasional writes are happening closer to users, sometimes literally on their laptops. However, it also involves more complex security, data management and replication issues.

Endless storage capacity coupled with finite access also wreaks havoc with backup and retention. To fix the chaos, in the not-too-distant future you'll switch from removable storage to real-time disk-to-disk backups. Instead of sending boxes of tapes to off-site storage sites, you'll send small, prepackaged and inexpensive fixed-disk appliances.

The real problem, of course, will be predicting when and where on your network those problems will crop up. Anything to do with multimedia is clearly a potential trouble spot. It takes 1 million IMB documents to consume 1TB of storage, but only 290 hours of 1.5Mbit/sec. streaming video.

And once you determine which applications need special attention to bypass the I/O bottleneck, you'll have to figure out which approach is best to solve it.

It's generally pleasant to have all that capacity, albeit on relatively slow disks. But as Shaw said, getting more than you bargain for has its downside as well. ☐ 42126



SNAPSHOTS

Market Interest

Are you interested in buying iSCSI products in the future?



NOTE: 700 IT storage managers at companies with more than 50 employees

SOURCE: IDC, FORTHCOMING MARKETS, SEPTEMBER 2003

In Tandem

In the next year, many IT managers plan to undertake storage and server virtualization projects at the same time.



NOTE: 105 North American IT managers who plan to undertake a virtualization project in the next 12 months

SOURCE: FORRESTER RESEARCH INC., CAMBRIDGE, MAILED, JUNE 2003

Vertical Storage

The five industries that will spend the most on storage services in 2004:



MARK HALL

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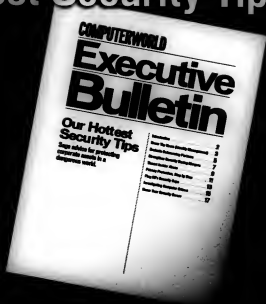
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James H. Fowler

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[illegible]

1-800 Contacts Inc.

PROJECT: Replaced direct-attached server storage with iSCSI SAN for its SQL Server databases.

PAYOFF: The iSCSI SAN used existing Ethernet hardware, saving \$60,000 over a Fibre Channel SAN alternative.



LARRY L. LARSEN

Early adopters of storage-area networks based on the Internet SCSI protocol say that so far, cost savings outweigh performance concerns. By Lucas Mearian

Users Build iSCSI Momentum

STORAGE-AREA networks that use the Internet SCSI protocol are gaining acceptance with corporate IT as a supplement to—or a complete replacement for—Fibre Channel SANs.

Products supporting the new iSCSI protocol issue SCSI commands and transfer block data over existing IP networks, allowing administrators to move storage networks onto existing Ethernet LAN infrastructures or new Ethernet subnetworks instead of building and maintaining a separate Fibre Channel network.

With iSCSI, there's no need for highly paid Fibre Channel specialists or expensive Fibre Channel switches, host bus adapters and cabling. And with IP SANs, existing Ethernet networks can be used to back up servers as well. For example, Microsoft Corp. has released a software driver that supports iSCSI-based backups of Windows systems.

With Gigabit Ethernet switches and high-performance processors, iSCSI is a viable option for midrange system applications as well as departmental or remote office backups, says Ahmad Zamer, interim chairman of the IP Storage Forum at the Storage Networking Industry Association in San Francisco.

Zamer points to cost as a major factor in iSCSI adoption decisions. A Fibre Channel switch can cost \$500 to \$2,000 per port vs. \$125 to \$150 for Gigabit Ethernet, and Fibre Channel host bus adapters cost twice as much on average as IP network adapters, he says.

User Experiences

Computerworld spoke with three early adopters who have begun testing iSCSI SANs. While some problems have

Continued on page 50

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Continued from page 48
 chosen, these users say they've been satisfied with both the price and the performance of the technology.

Adrian Porter, senior database administrator at 1-800 Contacts Inc. in Draper, Utah, was using direct-attached storage to back up five Hewlett-Packard Co. dual-processor ProLiant servers running SQL Server databases. But the system was exceeding storage capacity every six months, and performing data migrations with every storage upgrade was costly.

Initially, Porter decided to shop for a Fibre Channel SAN. Because he already had ProLiant servers, Porter first tested HP's Fibre Channel-based Enterprise Virtual Array, bringing a server and a copy of one of his databases to HP's test facility in Colorado Springs.

"We couldn't even get the same performance we were seeing on direct-attached storage," Porter says. But the problem wasn't just with HP's offering. "We did the same tests with EMC and got the same results," he adds.

Porter had considered using a network-attached storage appliance instead of a SAN, but that option didn't provide enough performance either. Unlike SANs, NAS devices route data through an intermediate server file system and transport the data in files rather than using more efficient block data transfers.

"From what our engineer saw locally, apparently if you get over a 30GB database, you start seeing degradation in performance," he says. In April, Porter settled on an IP SAN that included a Network Appliance Inc. fabric-attached storage (FAS) array and a NetStor nearline storage appliance.

While testing a traditional NAS appliance, "we were mazing out at 45MB/sec throughput," says Porter. "With iSCSI, we're seeing bursts of 100MB/sec. [when performing data snapshots and replication]."

Porter says one reason for choosing iSCSI was that he could avoid spending \$50,000 on a Fibre Channel switch. "We were able to leverage the same existing infrastructure we had with Gigabit Ethernet," he says.

Porter's IP SAN consists of a Cisco Catalyst 4500 Gigabit Ethernet switch, Intel Corp.'s Pro/1000 T IP Storage Adapter (a Gigabit Ethernet device) and NetApp's FAS940, a storage system that supports Fibre Channel disks internally but presents a Gigabit Ethernet and iSCSI interface to the network.

While Porter says throughput has been more than adequate, errors with

the Intel host adapter cards have resulted in servers losing their mappings to target storage devices. Porter is now considering using Microsoft's iSCSI driver and a standard Intel Gigabit Ethernet network adapter.

Porter says he was able to get 16TB of capacity out of his IP SAN vs. the 7TB to 8TB he could have afforded with a Fibre Channel SAN. "And we were able to use the networks we already had in place," Porter says.

Maintenance also has been easier. "Administering this from one central location has taken half as much time [as with Fibre Channel]. It allows me to focus on the database rather than on the hardware," he says.

PBS Takes SAN Supplement

Ken Walters, senior director of enterprise platforms for the Public Broadcasting Service in Alexandria, Va., has had a Fibre Channel SAN based on IBM storage for three years. He was satisfied with attaching all of his mission-critical servers to the SAN, which he uses as a high-speed backup network. But some 100 blade servers used for development work were still using direct-attached storage because he couldn't justify the cost of additional Fibre Channel switches and host bus adapter cards for them.

About a year ago, Walters estimated that each Fibre Channel switch would cost about \$25,000 and a Fibre Channel network adapter card for each server was about \$1,000.

An IP SAN using iSCSI devices seemed the perfect way to connect those "stranded" servers, and the IP network had a lot of spare bandwidth, Walters says. "At peak hours it's all used," he says, noting that his TV network distributes video streams to 177 member stations via satellite.

Public Broadcasting Service

PROJECT: Expand SAN cost effectively to include development department blade servers without sacrificing performance.

PAYOFF: The iSCSI SAN cost less than Fibre Channel. Performance was adequate and met video streaming requirements without the installation of expensive TCP offload engine network adapters on the blade servers.

Walters considered Cisco Systems Inc.'s MDS 9216 switch with an iSCSI blade but chose San Diego-based Stencel Networks Inc.'s i2000 Storage Concentrator router because of its ability to pool capacity from many storage arrays and dynamically provision it on the fly. The price was also right.

"Because iSCSI was pretty new, I didn't want to have to go to my boss and ask for a lot of money and have it not work out," Walters says. The Stencel product was under \$10,000 while the Cisco switch was \$48,000. "I could slide [the Stencel product] under the radar," he adds.

Walters spent about three months load-testing the iSCSI network using IBM BladeCenter blade servers, Red Hat Inc.'s Linux, Windows 2000 and Iometer, an open-source tool for measuring network traffic on single and clustered storage subsystems.

Walters chose MicroSoft's iSCSI initiative, but because he had heard that the processing of TCP/IP and iSCSI protocols can use up to 90% of CPU cycles on servers, he tested both standard network adapters and models with special TCP/IP offload engines (TOE) from Alacritech Inc. in San Jose and Intel.

The TOE adapters, which offload TCP/IP processing overhead from the host to an on-board processor on the adapter, worked flawlessly, Walters says. But the more expensive TOE

devices were unnecessary because his low-end servers never pushed more than 10MB/sec through the IP network. He opted for standard network interface cards at \$100 each instead of paying up to \$1,000 for TOE adapters.

"If you've got a Xeon processor and you're not CPU-bound, you probably don't need to worry about a TOE card," he says. "I could push about 50MB/sec out through the [iSCSI] adapter cards, but I can't think of many applications I'd be running that would push that much out."

A Good Enough Performer

Shawn Eveleigh, a senior systems administrator at Odville, Ontario-based Zenon Environmental Inc., has used an EMC Corp. Clarion storage array for two years to back up more than a dozen Dell Inc. and HP servers. The servers, which support more than 300 users at the developer of membrane technologies for drinking water purification and wastewater treatment,

Zenon Environmental Inc.

PROJECT: Switch from Fibre Channel to IP SAN to lower maintenance and expansion costs.

PAYOFF: iSCSI network storage was more cost effective and performed adequately for e-mail, document management and ERP application servers.

run Microsoft Exchange, Windows Server, the LiveLink document management system from Open Text Corp. in Waterloo, Ontario, and Zenon's ERP system.

With his maintenance contract coming to an end, Eveleigh began looking into the total cost of ownership of both maintaining his Fibre Channel SAN and upgrading it to accommodate growth. He concluded that the maintenance contract and expansion costs would have been more than what it would cost to deploy a new IP SAN.

Last August, Zenon chose PeerStorage, a native iSCSI storage array from EquiLogic Inc. in Nashua, N.H.

"I don't have e-commerce applications or high-transaction databases, so I can only attest to how iSCSI performs in a medium-size environment. And in that case, it does the job. I've done jet stress tests

with Exchange 2003 and very large database files, and I can't seem to hit its limits," he says. Eveleigh says in testing the array, he was able to get up to 40MB/sec throughput.

He was also able to minimize the downside risk by negotiating with the vendor. "I even got them to do a money-back guarantee," Eveleigh says. EquiLogic agreed to take back the equipment and issue a full refund if after 30 days Eveleigh couldn't get it to work adequately. "That alleviated our risks," he says.


Eveleigh says the SAN installation was almost a turnkey operation. Once the physical network connections were plugged in, he spent about a half-hour configuring the proper IP addresses and another 10 minutes or so setting up storage volumes.

"The bottom line is, as long as the [host] servers see the storage and can get at that performance level that keep up at a reasonable cost, that's all I need," he says. **□ 42189**

GET READY FOR IP SANs

Adoption of the iSCSI protocol will enable IP-based storage-area networks that will challenge Fibre Channel for dominance.

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World's Tiniest Drive Holds 4GB of Data

Hitachi Ltd. has unveiled a 4GB version of its Microdrive miniature hard disk drive, which is expected to sell for about \$500. The company says it's the world's smallest hard drive, weighing just over half an ounce (16 grams) and equivalent in size to a matchbook.

The Microdrive competes with 4GB Compact Flash memory cards, which allow for faster data access and lower power consumption but cost at least twice as much as the Microdrive. Both use the FAT32 file system, because the FAT16 system has a limit of 2GB.

Microdrive technology was originally developed by IBM but was acquired by Hitachi when it bought IBM's hard disk drive business (QuickLinks 35383 and 29051).

— Marym Williams, IDG News Service

Lessons Learned From The 9/11 Data Crisis

For two weeks after the 9/11 terrorist attacks, consultants at Acquis Consulting Group LLC couldn't get into their New York offices because of concerns about the structural integrity of their building and nearby buildings, a block away from the World Trade Center.

As a result, the firm's staff was unable to access critical business data on laptop PCs inside the offices, says Randall Kane, chief operating officer and founding partner. And there was no formal, mandatory backup procedure — many consultants hadn't backed up data in over a month — which "left us

blatantly unprepared," he says.

After returning to its offices, the consulting firm embarked on a serious search for a system that would provide mandatory backup for its often-traveling consultants.

Acquis picked an online backup service from Connected Corp. in Framingham, Mass., and Kane says he has been very happy with the service. Now, when a consultant's laptop crashes, a disk image can be downloaded to a new laptop, for example.

Best of all, Kane says, backup has become unavoidable. Users can defer the online backup routine two times if it's inconvenient, but the next time the laptop goes online, the Connected backup process begins automatically.

Patent Watch

■ An expandable, modular, hard-disk system. Upgrading PC storage capacity often requires installing an external hard

drive or replacing the internal hard drive and upgrading the power supply to match. This invention calls for a stack of interconnected hard-disk modules with self-contained power supplies. Adding capacity would mean plugging another storage device into the stack.

As an added bonus, if there are three hard drives, data can be stored on two



Source: NEPCO, LYNCH & CO. (PATENT PENDING)

“The role of tape will start diminishing, but IT departments won't feel comfortable with the smaller role for at least 24 months.”

ARUN TANEJA, FOUNDER AND CONSULTING ANALYST, TANEJA GROUP, HOPKINTON, MASS.

of the drives, and parity-checking information for that data can be stored on the third drive. If any one of the disk drives fails to operate, all of the data can be restored by accessing the remaining two drives. — U.S. Patent No. 6,640,235, issued Oct. 28.

Inventor: Michael H. Andersen, for Intel Corp.

■ Controlling the disk-drive rotation to reduce noise and vibration. The on-screen user interface (which looks like a volume-control slider) is able to alter the speed of the spinning CIO-RM to provide a sufficient rate of data exchange while also reducing the objectionable noise and vibration. — U.S. Patent No. 6,639,883, issued Oct. 28.

Inventor: Vladimir Kopyzhitsky, for Data Stream Info Inc., New York. 42524

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QuickLink K7700
www.computerworld.com

5 Petabytes of Biometric Data

THE U.S. DEPARTMENT OF Homeland Security is gearing up to install a huge biometric border-control system to check the identities and visas of the 500 million foreigners who enter the U.S. each year. Each visitor will be checked against lists of people with terrorist connections, criminal convictions or visa violations (QuickLink 38598).

The first phase begins Jan. 5 with fingerprinting and photo equipment at 115 airports and 14 seaports. In the next few years, the system is expected to cover all air, sea and land ports of entry. It will add other types of biometric identification, such as facial recognition or iris scans, as the technologies mature.

The U.S. General Accounting Office has called the massive IT project “a very risky endeavor.” And one of the challenges will be figuring out how to



store and transmit all of the biometric data collected, says Katherine Goodier, technical director of business development at Washfield Government Services Inc. in Herndon, Va.

Goodier estimates that the full-fledged system will collect about 5 petabytes of data per year and will need ultrahigh data access and networking technologies to make sure there aren't long delays for travelers. “It will require things that don't exist today,” she says.

“There's been a lot of discussion about the front-end biometrics, but little discussion of the back-end storage challenges,” Goodier says. The data-transfer challenge is especially great at the remote U.S./Mexico border crossings, where IT infrastructure is poor and may require wireless access, she adds.

— Mitch Betts

The Almanac

An eclectic collection of research and resources. By Mitch Betts



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SOURCE: MERRILL LYNCH & CO. OCTOBER 2003

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Serial vs. Parallel Storage

DEFINITION

Getting data to a storage medium requires transmission. **Parallel transmission** has historically been the preferred way to write data to disk. But at current speeds, **serial transmission** can be faster and offers other advantages.

BY RUSSELL KAY

DATA STORED on disk is made up of long strings (called tracks and sectors) of ones and zeroes. Disk heads read these strings one bit at a time until the drive accumulates the desired quantity of data and then sends it to the processor, memory or other storage devices. How the drive sends that data affects overall performance.

Years ago, all data sent to and from disks traveled in serial form — one bit was sent right after another, using just a single channel or wire.

With integrated circuits, however, it became feasible and cheap to put multiple devices on a single piece of silicon, and the parallel interface was born. Typically, it used eight channels for transmission, allowing eight bits (one byte) to be sent simultaneously, which was faster than straight serial connections. The standard parallel interface used a bulky and expensive 36-wire cable.

So why are vendors dropping parallel interfaces in favor of serial ones, when we need to get data to and from disks faster than ever?

For example, most printers don't even come with parallel ports anymore. Laptops have

dropped traditional parallel and serial ports in favor of higher-speed Universal Serial Bus and IEEE 1394 ports. [See QuickLink 293932 for more about these technologies.] We now see this same migration in the interfaces that connect disk drives.

At first glance, this seems counterintuitive. Isn't parallel more efficient than serial, with more capacity? Not really, and certainly not anymore. At current speeds, parallel transmission has several disadvantages.

Processing Overhead

First, remember that data is stored and retrieved one track at a time, one bit at a time. We talk about bytes for convenience, but a byte is just a line of eight bits in a row, and ultimately, we have to process each bit separately.

Thus, before we can send a byte in parallel to a disk drive, we have to get those eight bits and line them up, funneling each to a different wire. When we've done all the processing and moving to get them all ready, we fire off that byte.

At the other end of the cable, when the drive receives the bits, it must go through the reverse process to convert that byte back into a serial bit stream so the disk drive writes

heads can write it to the disk.

To visualize this another way, think about what's almost precisely the reverse process — converting parallel to serial for transmission and back again. This is what happens in sending Morse code over a telegraph line. The message starts out as written words (think parallel) on a sheet of paper. A processor (i.e., the operator's brain) has to convert each letter into a series of dots and dashes (serial) and then send these over the wire.

At the receiving end, another processor has to listen to these serial dots and dashes, then convert them back into letters and words. A lot of

overhead is required because the transmission medium doesn't match the original input or desired output.

Signal Skewing

As a signal travels over a wire or an integrated circuit trace, imperfections in the wires or integrated circuit-pad drivers can slow down some bits.

In a parallel connection, the eight bits that leave at the same time don't arrive at the other end at the same time; some will get there later than others. This is called skew (see diagram below). To deal with this, the receiving end has to synchronize itself with the transmitter and must wait until all bits have arrived. The sequence of processing is this: read, wait, latch, wait for clock signal, transmit.

The more wires there are and the longer the distance they span, the greater the skew and the higher the delay. This delay limits the effective clock rate as well as the length and number of parallel lines that are feasible to use.

Crosstalk

The fact that parallel wires are physically bundled means that one signal can sometimes "imprint" itself on the wire next to it (see diagram). As long as the signals are distinct, this doesn't cause problems.

But as bits get closer together, signal strength attenuates over distance (especially at higher frequencies), and spu-

rious reflections accumulate because of intermediate connectors. As a result, the probability for error grows significantly, and the disk controller may not be able to differentiate between a one and a zero. Extra processing is needed to prevent this.

Serial buses avoid this by modifying signals at the time of transmission to compensate for such loss. In a serial topology, all the transmission paths are well controlled with minimum variability, which allows serial transmission to run reliably at significantly higher frequencies than parallel designs.

The Newer, Smaller Serials

We've already seen serial connections displace parallel ones for printers and other peripherals. Now, inside computers, we're replacing parallel connections to disk drives and arrays. Both SCSI and Advanced Technology Attachment (ATA), with a new serial architecture called Serial ATA Attached SCSI and Serial ATA (QuickLink 36976).

Instead of parallel's large connectors and wide ribbon cables that can block airflow inside a PC, small serial wires comparable in size to telephone cords, along with a new power connector that puts 15 pins into the space of the older device's four, will both unclutter and cool off the interior of the computer.

The Peripheral Component Interconnect bus that connects other devices inside the case is being replaced with a serial interface called PCI Express (QuickLink 36960).

Other storage-related serial system interfaces include Serial RapidIO, InfiniBand and Fibre Channel. ☐ 42960

Kay is a Computerworld contributing writer in Worcester, Mass. You can reach him at russkay@charter.net.

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QUICK STUDY

Crosstalk (right) occurs when the signal on one wire in a parallel bundle imprints itself on an adjacent wire. Skew (below) is the result of random imperfections in the wires and connections of the parallel bundle.



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CAREERS

THE COMMONWEALTH OF Massachusetts requires its hospitals to store patients' medical records for 30 years. That's no small feat for CareGroup Health Systems, a network of six hospitals that's associated with Harvard Medical School in Boston. To meet that requirement, it currently stores 70TB of patient medical data.

But CIO John Halamka expects to double storage capacity to 140TB by 2004 to accommodate what he calculates will be needed to meet the storage and security requirements of the Health Insurance Portability and Accountability Act (HIPAA), as well as the financial data storage requirements established by the Sarbanes-Oxley Act.

To handle the onslaught of data, Halamka in March hired a storage manager, a newly created position responsible for strategic planning for CareGroup's skyrocketing storage needs, including three classes of storage retrieval services.

"The only way that you can deal with the overwhelming growth of the storage requirements is to have a very thoughtful strategic plan for how to build centralized storage," Halamka says.

Many CIOs agree. In the face of mind-boggling storage requirements brought on by new legislation, some IT departments are realigning and retraining employees to handle risk management, adhere to business rules and ensure privacy.

Sixty-five percent of the more than 100 companies polled by Meta Group Inc. in August 2003 claim to be actively involved in projects to meet Sarbanes-Oxley compliance requirements. Another 25% of the respondents said they're planning to initiate such projects in the near term. And nearly all health-related fields are feeling the pinch of HIPAA storage requirements.

But despite the work ahead for IT departments, the size of IT staffs and the cost of storage, budgets remain flat. As a result, hardware at the end of its life cycle is being replaced with higher-density storage and smarter storage technology that requires less maintenance.

Restructuring the IT Department

Blue Cross and Blue Shield of Minnesota in Egan was ahead of the game when HIPAA and Sarbanes-Oxley compliance became a top priority. Already offering its customers secure Internet access to claims information, the \$5 billion health insurance provider was well on its way to compliance with HIPAA, which mandates that records be available to customers and that confidentiality be protected.

But complexities in the federal law's requirements, such as one mandating that sensitive medical records of girls over the age of 12 be kept confidential from their parents, prompted CIO John Ounjian to

Thinking Outside The Box

Regulatory compliance issues are changing the jobs of storage professionals.

By Stacy Collett



undertake a major restructuring of the IT department.

"I have to bring privacy and security to individual household members. So within storage management, privacy and regulation make it quite complex," he says.

Nearly 150 IT staffers were retrained or realigned into new positions. "We needed more engineering types and more robust risk management-type people that understood security and controls," Ounjian says.

A handful of new IT employees were brought in, but the staff size remained the same because of attrition, he adds. IT costs also remained flat through the transition.

Also, Ounjian appointed three senior-level advisers who report directly to him. One, a vice president in charge of transaction engines, makes sure business rules for compliance are being properly applied, documented and executed. "She needs to know storage management, where the data is coming from and how the output is being managed," Ounjian says.

A second adviser, also a vice president, is in charge of technology and ensures that information flows quickly and securely. The third, a director, makes sure security, privacy, continuity, risk controls and passwords are all in play when allowing access to data. So far, Ounjian says, the transition has been successful, because employees have been willing to change roles.

What's Next?

Changing roles could become the norm for storage professionals. As storage systems become more intelligent and in some cases self-managing and self-healing, storage administrators will move away from managing the systems and toward managing and protecting information, according to Peter Gerr, an analyst at The Enterprise Storage Group Inc. in Milford, Mass.

"A lot of people I speak with are looking at [storage management] in terms of content management, policy and procedure, rather than hands-on, highly technical storage administration," Gerr explains.

But in the short term, huge challenges remain with storage capacity planning, provisioning and backup. "Maintaining and deepening the skill sets they have today is important," Gerr says.

Storage professionals should also build a foundation in network storage as the networking market continues to converge with storage. Of course, "an awareness of the business issues that are driving the organization is important, too," Gerr says. **◆ #1064**

Collett is a freelance writer in Sterling, Va. Contact her at stcollett@aol.com.

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The Next Chapter

Predictions: Industry pundits foresee terabyte cell phones and the death of the database.

■ SENSIBLE DATA LIBRARIES

An entirely new set of career paths will emerge from the dramatic growth of online storage. These new "corporate librarians" will make sense of the millions of pieces of data amassed by a firm's workforce and turn them into a sensible, searchable library of knowledge, instead of the data chaos we now have.

■ James W. Gabberty, associate professor of information systems, Pace University, New York

■ WIRELESS DATA EVERYWHERE

CDs, DVDs, flash drives and floppy disks will become obsolete in the next few years. Wireless access speeds are increasing dramatically, allowing people to access their data via the Internet as fast as they do now from their hand-wired devices. Just as people can make cell phone calls from practically anywhere in the world today, they'll be able to access their personal or business data wirelessly from anywhere in the world. There won't be a need to "store" it locally or copy it to a portable storage medium to take it to another computer.

■ Michael Eruseff, president, Winchester Electronics, a unit of Northrop Grumman Corp., Wallingford, Conn.

■ ROLLING BACK IN TIME

By 2007, fully protected, versioned file systems will be widely available. A versioned file system is time-enabled, allowing users or applications to roll back any file to a previous state. For applications such as databases, it means that it's easy to go back in time and run a report for the database as of,

say, the end of last month. For the desktop user, it means the user can go back to any previous version of a file without ever doing a backup—or before a virus infected the file. In essence, file systems will become inherently self-healing, rendering viruses harmless and eliminating the need for backup as we know it.

■ Dave Howard, president, Colorado Software Architects Inc., Loveland, Colo.

■ A TERABYTE IN YOUR HAND

Expect a terabyte of data storage in a cellular phone by 2007. This will be achieved through continued advancements in flash silicon and multilevel cell technology.

■ Dana Gross, chief marketing officer, M-Systems Flash Disk Pioneers Ltd., Fremont, Calif.

■ MIGRATION HEADACHES

Data migration will become one of the largest issues in data storage by 2005. While storage devices will be capable of holding hundreds of terabytes of data, the time required to upgrade hardware or migrate data to a secondary location will become prohibitive, often stretching into weeks or months. This command will dramatically expand the market for zero-downtime data migration tools and storage systems that can mirror or migrate data from other hardware.

■ Geoff Burrell, chief technology officer, BlueArc Corp., San Jose

■ CENTRAL ARCHIVES

In three years, nearly all publicly traded companies will establish enterprise corporate data archives. To comply

with a complicated patchwork of regulations and discovery requests, companies will opt to save almost everything in centralized enterprise data archives on very inexpensive storage systems. Centralized archives will contain a copy of ERP data, e-mail and documents, and will be both centrally managed and audited. These archives will become as pervasive as firewalls are today.

■ Mark Diamond, president and CEO, Contoural Inc., Los Altos, Calif.

■ HOLLYWOOD CALLING

Storage vendors are so focused on the corporate data storage market that they can't comprehend the growth of storage requirements in nontraditional markets such as the entertainment industry. Consider that over the next

decade more and more movies will be digital, yet a single two-hour movie will require about 800TB of storage. The digitization of the film industry alone will generate millions of petabytes of stored data, far more than today's entire corporate storage market.

■ Barbara Murphy, vice president, Sware Inc., Sunnyvale, Calif.

■ SECRET AGENTS

Agents, or bots, will be used extensively to mine enterprise data for trends, insights and customer intelligence within the next two years. For exam-

ple, the agent could mine stored e-mail looking for employees talking to competitors, sexually harassing people or doing positive things. If I were running the lending department at a bank, I'd want to know whenever someone completed a loan over \$300,000. Employees will have an interface that allows them to program an agent in plain language to do the search and then show the results in a pop-up window.

■ Scott Klossow, CEO, Critical Technologies Inc., Oklahoma City

■ DATABASE, R.I.P.

The database is dead. New smart file systems from storage vendors will begin to emerge in 2004 that leverage self-describing and self-adapting technologies, thus avoiding the complexity and performance tax of databases. The

heart of this trend will be to describe data not in terms of rows and columns, but rather as business objects that can be accessed and managed in file containers, directly

addressable by applications. It's sometimes called object-based storage. This will be a ubiquitous feature in two years, eroding the revenue and mind share of database vendors in three years. Smart-storage vendors will replace databases for simple search and retrieval.

■ Michael Howard, CEO, OuterBay Technologies Inc., Campbell, Calif.
■ 42196

MORE PREDICTIONS

Check out last year's batch of storage forecasts. Who was right?

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Advertising Supplement

IT Careers: Catalyst Issues Women in High Tech Results

When Microsoft and Catalyst joined forces to look at the progress of women in high tech careers, the effort was destined to provide some surprising and actionable information. It did. A half dozen roundtables and dozens of interviews later, companies from the large to small, from the mature to the fledgling, have weighed in on the status of women. Companies participating in the study include IBM, Dell, Agilent, Motorola, Zilux, Xerox and Texas Instruments.

The findings provide a partial picture. Less than 30% of the nation's IT workers are employed by SEC-defined high tech firms — those whose business is production of computing hardware and software. Regardless, the findings of "Sit by Sit: Catalyst's Guide to Advancing Women in High Tech" could apply to high tech jobs in other industries, according to Irene Lang, president of Catalyst.

The biggest ah-hah of the study: companies who pride themselves on promoting people based on merit as a core element of their culture in fact do not. Men and women in the roundtables reported their companies are exclusionary and don't support women, according to the study, which was released Nov. 12. "Their actions surrounding the advancement of women are inconsistent with the perception the industry has of itself," says Lang.

Other barriers to the advancement of women in IT professions included: companies universally don't strategically or objectively identify and develop talent; women lack role models, networks and mentors; and the demands of work and careers are at odds with personal life and responsibilities.

The good news is progress has been made. The Catalyst Award each year recognizes companies for innovation of programs and results they show in terms of impact on success and opportunities for women. "If you look at 10 years ago, the award was given to companies for outstanding child care options," says Lang. "Today the bar is much higher. We are looking at companies that have grappled with work design and who have been responsive to the needs of employees at different phases of their life cycle."

"Identifying and managing talent is much the same situation," Lang adds. "We are seeing more explicit and forward-looking talent management programs, beyond looking over a list of names, but mostly in larger companies. And managing and developing talent very much connects to the feelings of isolation, lack of role models and the need for better networks among professionals as they grow."

To deal with the barriers, Catalyst has prepared a tool kit of case studies and programs that can be used by

companies large and small to address the barriers to women's advancement. The goal: change. "In the next 12 months, we're talking about really smart people who care about their companies, their careers and their lives, and that they become aware about what we have learned and have plans in place."

"Results will come over a longer period of time," she adds. "Just as we've seen a real shift from 10 years ago to today, we want to see just as big a change in the next decade. Ten years from now, we hope to see better representation of women at senior and CEO levels. We would hope to see a reverse in the decline of women getting technical degrees (which has fallen by a full 10 percentage points in the last decade). And, we would hope that the Catalyst Award would have high tech companies as regular winners (only IBM and TI have claimed the award from the high tech sector), demonstrating leadership and innovation."

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FRANK HAYES • FRANKLY SPEAKING

Wal-Mart Says So'

LET'S GET ONE THING STRAIGHT about this plan by Wal-Mart requiring suppliers to put radio frequency identification tags on what they ship to Wal-Mart stores. For the 100 suppliers that have to start putting RFID tags on every case and pallet they send to the world's largest retailer starting in January 2005, this isn't about supply chains or business process re-engineering or, really, about business or IT at all.

It's about doing what the 800-pound gorilla wants.

That's important to understand, especially when industry analysts blithely babble about the need for cost sharing on this project because it will be so expensive for Wal-Mart's suppliers. If history is any guide, there won't be cost sharing. And there won't be accommodation for multiple standards, or flexibility in the deadline, either.

This is not a negotiation. It's not a process or a discussion or a partnership. It's a simple reality: If you want to do business with Wal-Mart, you'll do it Wal-Mart's way. Otherwise, the 800-pound gorilla will find somebody else to do business with.

How do we know this? Because the RFID project at Wal-Mart is shaping up to be the spitting image of a technology rollout that happened almost two decades ago.

Back then it was Sears and Kmart that required suppliers to start sending invoices, bills of lading and other shipping-related documents using electronic data interchange. As the 800-pound gorillas of U.S. retailing in the 1980s, they could make that demand. And what they demanded, they got.

So starting around 1985, if you wanted your products in Sears stores, you spent big bucks on EDI. Either that or you stopped being a supplier to Sears — which some companies did. And they were replaced. And nobody at Sears shed a tear.

There was no cost sharing. There were no negotiations. None of the data or IT requirements were created for the benefit of the suppliers.

In fact, other 800-pound gorillas in the 1980s were demanding EDI from suppliers too — and no two EDI versions were exactly the same. So suppliers that did business with Sears needed an EDI system. And if they also did business with General Motors and Ford, they

needed two other, different EDI systems. Efficient? Not for suppliers. The efficiencies of EDI were all for the gorillas.

And you can expect Wal-Mart's RFID implementation to work pretty much the same way. Wal-Mart is the toughest cost-cutter in discount retail, a business segment that operates on razor-thin margins anyway. You can expect no cost sharing, no IT accommodation, no sweetness and light. If you want to stay a Wal-Mart supplier, you'll do what the gorilla wants.

Is that one-sided? Sure. Face it, the business case for this IT project consists of three words: "Wal-Mart says so."

And in IT shops, where the past few years have taught us that every IT project must show a return on investment or demonstrate improved efficiency or at least generate a credible advantage for your business, this is all wrong. There's no ROI or efficiency or benefit for a supplier — just the cost of all those RFID tags and the infrastructure to support them.

Sounds sort of like Y2K all over again, doesn't it? Another no-choice, no-negotiation, no-business-benefit, no-extension-on-the-deadline IT project. Except this time it's dictated by Wal-Mart, not a technical glitch.

You may be able to squeeze some benefit out of the situation — say, better internal quality tracking using the RFID tags or improved warehouse efficiency. If your company is a Wal-Mart supplier, you should be figuring out your options and presenting them to your top management. They'll want to know how they can make the best of an expensive situation.

But don't kid yourself. That 800-pound gorilla doesn't care whether your business benefits from RFID.

As for that — and for paying the tab — you're on your own. ☐ 42786



How They

For a more detailed look at the RFID project, see the article on page 71. The project is a complex one, involving a lot of different parties and a lot of different technologies. The project is a complex one, involving a lot of different parties and a lot of different technologies.

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